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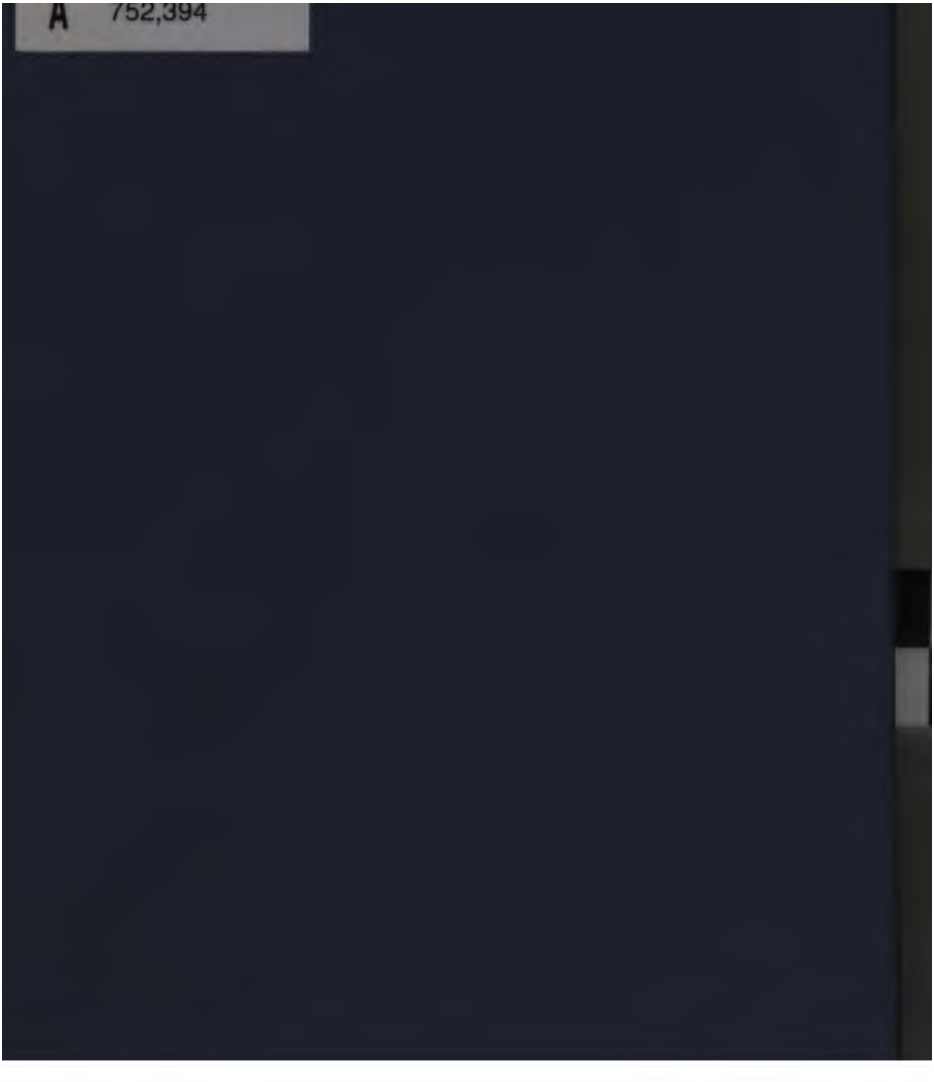
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Anne Mary Powell.

With much love from her

Aunt Agnes. 1858.

Stephenson and his son at work in the Cottage. P. 138.

THE

TRIUMPHS OF STEAM;

OR,

Stories from the Lives

OF

WATT, ARKWRIGHT, AND STEPHENSON.

Burrows Mrs. E.

BY THE AUTHOR OF

"MIGHT NOT RIGHT," "OUR EASTERN EMPIRE,"
"THE MARTYR LAND," &c.

WITH ILLUSTRATIONS BY JOHN GILBERT.

LONDON:

GRIFFITH AND FARRAN,

LATE GRANT AND GRIFFITH, SUCCESSORS TO NEWBERY AND HARRIS,

CORNER OF ST. PAUL'S CHURCH YARD.

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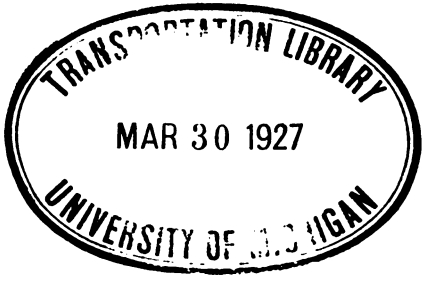

7-20-53 PW

TO

ROBERT STEPHENSON, ESQ.

These Stories

OF HIM WHOSE LABOURS HE SHARED,

AND WHOSE FAME HE INHERITS,

ARE DEDICATED,

BY ONE

WHO OWES MUCH TO HIS EARLY INFLUENCE.

PREFACE.

THE author of these stories is anxious to take this opportunity of offering her sincere thanks to the friends who have so kindly assisted her in her undertaking.

For many of the anecdotes of Mr. Stephenson, she is indebted to those who knew him well, while for the accuracy of the general narrative, she has relied wholly on the excellent life of George Stephenson written by Mr. Smiles. Permission to make use of this valuable work was most kindly obtained for her by Mr. Robert Stephenson, whose ready and cordial assistance she cannot too gratefully acknowledge.

In the preceding memoir of Watt, the writer has derived her information principally from the lecture delivered by Arago, after the death of the great engineer, and from the biography subsequently published by Mr. Muirhead.

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* From photographs in the possession of Robert Stephenson, Esq.

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THE

TRIUMPHS OF STEAM.

CHAPTER I.

The uses of steam, as a motive power, known from remote antiquity — Origin of the steam-engine — Gradual improvements — Watt — Anecdotes of his boyhood.

"AUNT HELEN, are you going down to the station, to meet Uncle Henry?" inquired Charles Percival, as he looked up from a Bradshaw he had been intently studying.

"Yes; and you may go with me if you like it."

"Thank you; I should like it very much. Only fancy, Aunt Helen," added Charles, "that Uncle Henry was in Paris yesterday, and will be at home to-day. Is it not wonderful? What did people do before there were railroads and steam-boats?"

"Stayed at home like sensible people," replied Mrs. Grenville with a smile.

"But seriously, Aunt Helen; if they were obliged to take any long journey, what did they do then?"

"Went by coach or van, or in their own carriages, on horseback, or on foot, as the case might be."

"What a waste of time!" exclaimed Charles. "It was a good thing that steam was discovered; who did discover it, Aunt Helen?"

"Do you mean, who applied the power to its present purposes?"

"No, I meant, who invented steam."

"Invented steam!" exclaimed Ernest, laughing. "Why, Charles, whoever boiled the first pot of water after the world was created invented steam, Adam perhaps."

"It is a law of nature, my love," interposed Mrs. Grenville, seeing that Charles was on the point of making an angry rejoinder, "wherever there is boiling water, there must of necessity be steam."

"But then why did not the old Greeks and Romans have steam-engines and railways?"

"Because they did not understand how to apply the power."

"And who first found that out?"

"Like all other great discoveries, it has been a gradual process. The man whose genius first practically developed its capabilities, was the celebrated James Watt."

"And who was he?" asked Charles.

"Oh! I know," said Arthur; "he was one of the most eminent engineers that ever lived. Mamma," added Arthur, "I wish you could do something that I want very much."

"What is that, my love?"

"Why, mamma, I have got an idea in my head, and I want to work it out; and I have been reading all the books lately I could find about the steam-engine, but they have such long hard words, they puzzle and confuse me; now I think if you could tell me exactly who first thought of applying steam to its present purposes, and trace the various improvements made in the engines, I should get some clear notions into my head, and then when I went back to my books I should really understand what I was about. Will you mind telling us all about it, mamma?"

"I should be most delighted, my love, if I thought I understood the subject sufficiently clearly to make my explanations of any use to you; but I am afraid what you want requires a much greater knowledge of science than I possess."

"Oh no, mamma, I am sure you could tell me all I want to know."

"I am afraid not; the utmost I could do would be to

give you a biographical sketch of those men, whose genius and perseverance have opened up, through the application of steam power, means of usefulness and civilization, such as the world never before possessed; and in doing this, I will explain to you their various inventions as well as I can, and I must ask papa to help me whenever I am at fault."

"Oh do! yes, that would be jolly," exclaimed the children; and Charles added, "I should like that, Aunt Helen, because you are sure to tell us some amusing stories, not those horrid dry calculations Arthur is so fond of poring over. To look at his papers and slates you would think he was always drawing models for agitated scarecrows."

"Wait and see what become of my scarecrows, before you laugh at them, Charles," replied Arthur good-naturedly.

"Yes; and remember, Charles," said Mrs. Grenville, "concentration of thought, let the subject be what it will, is the first step towards success. When Sir Isaac Newton was once asked how it was that he discovered the principle of attraction, he replied, 'By constantly thinking of it.' Had this not been the case, apples might have fallen all around him without revealing to him the law of gravitation; so, as Arthur says, wait and

see what become of his scarecrows, before you laugh at them."

"Well, if I may not laugh," said Charles, "the next best thing to do will be to try and understand; so I promise you, Aunt Helen, to listen as attentively as possible, and who knows but that I may end by drawing scarecrows myself?"

"That would be a wonderful result. If I can inspire you with some of the wonderful energy which has distinguished Watt and Arkwright, George and Robert Stephenson, it will be worth while to tell you their stories."

"Well, Aunt Helen, never despair. How often you have said so to me."

"But, mamma," said Arthur, "when was steam first known as a moving power?"

"Probably much earlier than is generally supposed," replied Mrs. Grenville, "for Arago mentions a curious anecdote of Anthemius, an architect, who having a particular spite against Zeno, his next-door neighbour, thought of a most ingenious method of venting it. He placed some caldrons, large enough to hold a considerable quantity of water, on the ground floor of his own house. From these he passed a tube into the wall which divided his dwelling from Zeno's, and conducted the tubes

into the beams of Zeno's sitting-rooms; then making the water in the caldrons boiling hot, the steam rushed up the tubes, shaking the apartments of his unfortunate victim as if they had been convulsed by some sudden earthquake.

"It is generally supposed, that it was to their knowledge of the properties of steam, that the magicians of Egypt were indebted for the power of working many of their pretended miracles, and there is no doubt that the pagan priests, and probably many of the monks of the middle ages took advantage of the same secret. Near the banks of the Weser stood the temple of a celebrated German god, Busterich—held in profound veneration from the awful manifestations he was in the habit of making to such of his worshippers as had the misfortune to fall under his displeasure. Suddenly as the evil doers entered his courts, they would be startled by a sound, loud as pealing thunder, and then in a moment they were enveloped in so thick a cloud, that their deity was entirely hidden from their view. Terrified by a phenomenon for which they were utterly unable to account, they were only too thankful to make their peace on any terms, little imagining that some boiling water had been all that was required to bring their fierce, wild spirits into subjection. This stratagem was

managed by the figure of the god being cast in metal; the head was left hollow, that it might be filled with water, and an apparatus was very skilfully contrived by which the water might be gradually heated; the eyes were well plugged, and an aperture was left in the forehead which was also carefully closed. The priests were quite aware of the length of time that the water would require to heat, and always so arranged matters that their god should receive his worshippers at the moment when the condensed steam was ready to explode. Out flew the plugs from the eyes and forehead, the steam rushed forth with the most violent noise, and the whole area of the temple was enveloped in a thick white cloud. No wonder that the ignorant multitude were terrified and astonished. We ought to be very thankful that times have changed since then, and that now every fresh discovery of science only tends to promote the happiness and well-being of mankind, instead of being made an instrument by which the masses of the people may be kept in ignorant subjection. It was not, however, until the beginning of the seventeenth century that any one seems to have thought seriously of the possibility of using steam power to supply the place of manual labour; and to a Frenchman the honour of the discovery is due, although

we are rather apt to claim the merit for our own countryman, the Marquis of Worcester."

"The French are always far more ingenious in making discoveries than ourselves," said Charles.

"Ah! but," added Ernest, "they do not bring their inventions to such perfection as we do; do they, mamma?"

"Not in those that require great strength and solidity," replied Mrs. Grenville. "As a nation, the French are endowed with such rapid and brilliant imagination, that they have not the patience to enter into all the minute details of business with the perseverance that distinguishes their more slow-minded neighbours. Solomon de Caus could point out very ingeniously the theory of a steam-engine, but he left it to Captain Savery to reduce his theory into practice. A very curious story is told of a visit the Marquis of Worcester paid to the Bicêtre, a celebrated madhouse, when he was in Paris in 1641. He and a party of ladies were being conducted round the building, when their attention was attracted by the sound of loud cries, as of a person in the greatest distress.

"'Who is the unfortunate man who is in such dreadful suffering?' asked the Marquis.

"'He? Oh, he is a poor fellow,' replied the keeper,

'who fancies that he has made some great discovery—and he has pestered the government so constantly for means to carry out his absurd invention, that at length, to spare themselves any further importunity, they have shut him up here—and he goes on all day long just as you hear him now.'

"'I am not mad! I am not mad!' exclaimed the unfortunate prisoner, whose cell the party had by this time approached; 'but I have made such a discovery, that if I might but try it, I should be called the greatest benefactor the world has ever known. If they would but listen to me, people would travel faster by steam than the swiftest horses have ever been able to draw them.'

"The Marquis of Worcester was much struck with the remark, and wanted to stop and question the unhappy man; but this the keeper, fearful of incurring the displeasure of his superiors, would not allow; and the party moved on, leaving the man—whose mind was so in advance of the times as to render him the victim of ignorant narrow-mindedness—to pine in solitary confinement, and die at last a broken-hearted monomaniac. But so it has almost always been. The originator of any great discovery has seldom been the one to profit by it. In late years, indeed, this can hardly be said

so truly, for there is always a danger of running into extremes, and as education has become more general, as the marvels of science have been gradually developed, the world has become as credulous as it once was unbelieving. 'If so much has been accomplished,' people say, 'what wonders may not be yet in store?' and the consequence has been that every absurd notion of any clever theorist has been as eagerly caught at as if it had been founded on the unchanging laws of nature, or the best tested rules of science. Perhaps, however, of the two it is the least evil, because it is one which must of necessity work its own cure; whereas, in the other case, you extinguish a light which you cannot tell how many years it may require to rekindle. If the unfortunate Frenchman had not died a maniac in the Bicêtre, we might not have had to wait a century for Watt and Stephenson."

"When was Watt born, mamma?" asked Ernest.

"On the 19th of January, 1736."

"And what was known about the steam-engine at that time?" added Ernest.

"Very little for any practical purpose. Solomon de Caus had written his book, 'The Reason of Moving Forces,' in 1615. He had been followed in 1663 by the Marquis of Worcester, who actually made a small

engine, which, in his own words, 'could drive water up by fire;' but it does not seem to have been used, and people went to admire it as a sort of ingenious toy, without having a notion of the wonderful perfection to which it was afterwards to be brought. In 1698, an engine on a very improved principle was constructed by Captain Savery, who called it 'The Miners' Friend,' from its being designed principally to force up water from a great depth, and therefore being well calculated to clear the mines in which such large bodies of water are apt to accumulate. But the miners were afraid of their 'Friend,' and consequently it was very seldom employed: but perhaps after all this was fortunate, as in the then imperfect state of the machine, it is more than probable that constant explosions would have taken place, the men would have been frightened, and their fears would have interfered sadly with the success of any future experiments.

"The next great step in advance was made by Denis Papin, a man of rare ability, who, driven out of France on account of his religion, at the time of the revocation of the Edict of Nantes, took refuge in England; and then devoted himself entirely to scientific pursuits. But now I have come to a point in which I sadly want papa's help. We must ask him to make us a little

model, and then you will see the full value of the discovery which Papin made—that steam might be used as a medium for creating a vacuum, to ensure the regular action of the piston within the cylinder. By the heat of steam he produced one movement; by the sudden cooling, or condensation of steam, he produced the next. But still there was one defect, which, with all his ingenuity, Papin could not overcome. His piston worked regularly indeed, but it moved so very slowly that for any work requiring speed his engine would have been comparatively useless. His cylinder rested on a metal plate, which was made hot to generate the steam, and removed to condense it; of course this took a long time, and what was required was a rapid way of employing the two forces almost at the same moment.

"Accident gave the next clue towards success; some years after Papin's engines had been very generally employed in England, having been considerably improved by Newcomen and Cawley, a manufacturer, who had one of these engines on his premises, was very much astounded to see the piston seized with a sudden fit of agility, and working backwards and forwards at a most unnatural rate. Anxious to discover what was the cause of this very unexpected energy, he carefully examined the machine, and found that the

piston had become pierced, some cold water fell through the holes, and, passing through the steam, absorbed it—thus rapidly creating the required vacuum. This accidental discovery suggested the idea of pouring a shower of cold water into the cylinder as the piston was descending. It was found to answer admirably, and that a great increase of power was in this manner obtained.

"Still, with all these improvements, Newcomen's was a very difficult engine to manage, as it required the most undivided attention; it being necessary at every moment first to open the cock to let in the steam, and then to pour in the cold water intended to condense it. Now it happened that one day an engine was left in charge of a boy named Humphery Potter, who was infinitely fonder of play than of work. It was irresistibly provoking to him to hear his young companions' shouts of merry laughter, just outside the engine-house, whilst he was losing all the beautiful bright day watching a tiresome engine, and opening and shutting for everlasting two monotonous cocks. Why could not the tiresome things open and shut themselves? The idea once suggested to his mind, he eagerly looked about for some means of carrying it out. Being naturally as ingenious as he was fond of play, he hit upon a plan by which, by means of strings, the beam

might be made to open and shut the cocks for itself as it rose and fell in the cylinder. Nothing could be more successful than the experiment. The engine worked by itself, and Master Humphery ran off to signalize his success in a game of romps with his playfellows."

"Aunt Helen!" exclaimed Charles, "if you set such an example before me, you have no right to blame me because I like cricket better than lessons. Now remember, the next time you scold me for being idle, I shall remind you of Humphery Potter."

"I give you leave to do so," replied Mrs. Grenville, "if you will promise to show me at the same time that, before you left your work for your play, you had invented a scheme by which it could be done as thoroughly by mechanical assistance as by yourself. But I am almost afraid," she added, with a smile, "that the engine is not invented that will ever drive Latin and Greek into your head."

"At any rate, Aunt Helen, I have got the vacuum ready—that is something.

"How surprised, mamma," said Arthur, "the man must have been who first saw the engine working by itself."

"Very much surprised, indeed, and very angry, I

should think, with Potter for leaving his duty. However, the idea suggested by his expedient was immediately followed up, and rods were fixed to the beam, furnished with pegs which pressed upon the cocks, opening or shutting them as the case might be, and thus enabling the engine to do its work entirely by itself, with the exception that the stoker was of course obliged to see occasionally to the fire. This was the last great improvement made in the steam-engine, until the time when James Watt by discovering how to condense the steam so wonderfully developed its extraordinary powers of usefulness.

"From his earliest childhood James Watt was remarkable for the great thoughtfulness of his character. To a certain extent this was perhaps owing to his being of a very delicate constitution, and therefore unable to enter into the more active amusements of his young companions. He would spend hours in thinking over the various scientific problems which were his great delight. On one occasion a gentleman was paying a visit to his father; James, a mere child of six years old, quite regardless of there being a visitor in the room, was wholly engrossed in drawing lines with white chalk upon the floor. The gentleman looked at him for some little time in silence, but at length, angry, I suppose, with

Mr. Watt for letting his son make such a mess on the floor, 'I cannot think, Mr. Watt,' he exclaimed, 'how you can let that child waste his time in that way. Why do you not send him to school?'

"'Let us see what he is about,' said Mr. Watt, 'before we condemn him; James does not generally waste his time.'

"They got up to look—James had not even heard the remark, so entirely was his mind absorbed in working out a geometrical problem. At another time he was paying a visit to his aunt, Miss Muirhead. One evening when they were just sitting down to tea, James, instead of taking his meal as usual, was seized with a spirit of investigation; he drew the kettle towards him, he took off the lid, he put it on again; he got a spoon and held it to the spout, counting into how many drops of water the steam condensed; then he took a teacup and repeated the experiment. Nearly half an hour was occupied in this way, until at length Miss Muirhead's patience was fairly exhausted, and she said quite angrily, 'James, James, what are you about? are you not ashamed of wasting your time in this disgraceful manner?'

"But James was not wasting his time; boy as he was, at that moment he had obtained his first clue to his great discovery, that condensed steam might be em-

Young Watt absorbed with his Problems. P. 16.

then put them together again; and as soon as he had learned the principle on which they were constructed he would invent new ones. This aptitude for invention made him extremely popular amongst all his young playfellows, and his popularity attained its climax when he constructed a small electrical machine, which became an endless source of amusement to himself and his friends.

"Mr. Watt not being a wealthy man, it was necessary that his son should decide at a very early age what profession he would like to follow. His father's occupations were numerous; amongst other things he kept a sort of shop, where he sold nautical instruments and stores necessary for sailors. It occurred to James that if he were to become a mathematical instrument maker, he could both help his father and follow out his own favourite scientific pursuits. In 1754, therefore, when he was about eighteen years of age, he went to Glasgow, intending to reside there for a time, that he might learn the business. He had not, however, been many months at work before he was seized with an ardent longing to go to London, feeling sure that there alone he could properly learn all the niceties of his profession. To obtain sufficient means to carry out his project was, however, the great difficulty. His father's income was at this

time unusually small, and James did not like to encroach upon his generosity merely to gratify a whim of his own. It so happened, however, that he had attracted the attention of some of the most scientific men in Glasgow, and they not only confirmed his own impression that London was the only place where he could profitably study, but by the very high terms in which they spoke to Mr. Watt of his son, and the advantages which they pointed out as sure to arise for him from a visit to the metropolis, they induced Mr. Watt to listen favourably to James's wishes, and it was settled that he should follow his own inclinations and apprentice himself for a time to some celebrated London optician. Having made all his arrangements as economically as possible, James Watt left Glasgow on the 7th of June, 1755; and as the cheapest way of performing the journey he travelled on horseback, taking twelve days on the road."

"And now," exclaimed Ernest, "you can do it in exactly the same number of hours; oh, mamma, only fancy!"

"I wonder whether our children will do it in as many minutes," added Charles, laughing.

"I pity them if they do," replied Mrs. Grenville; "but such a supposition hardly seems more ridiculous to su, than the fact Ernest has just mentioned would have

seemed to men who lived a hundred years ago. Half a century later and Stephenson did not dare to say, lest he should be mistaken for a madman, that the engine he had invented could move at the rate of fifteen miles an hour. However, we must leave Watt travelling leisurely up to London, or we shall have papa arriving at the station before we are there to meet him, and that would be a terrible disaster; run away and get ready."

What strange fascination is there at a railway station, that the excitement never seems to die away? Go when you will there is the same sort of restless longing for the coming train, and amused stir in watching the departing one. You may have seen it all a hundred times before; but just as eagerly as ever you watch for the first faint breath of steam that you see rising up beyond that distant cutting; you strain your ear to hear the far-off whistle, or listen to the snorting engine, as gliding into the station it puffs out its disgust at being arrested in mid career. But it was a more than usually eager group that were watching that day on the platform of Ivybridge Station.

"It is lucky, mamma, that the train is a little late," exclaimed Ernest, as he looked down the line, in vain endeavouring to make out a symptom of its approach. "Kempton was quite in a taking; did we not come fast,

mamma? I wonder what papa would have said if he had seen the horses all in a foam."

"He would have scolded me, and very justly too; we were so busy talking, I quite forgot to look at the clock."

"I am very glad you did, Aunt Helen," said Charles; "it is such fun being late. I like scampering along, wondering whether we shall be in time or not."

"Oh, I do not," said Arthur; "I kept thinking all the way we should be too late, and that papa would be vexed."

"Nonsense," replied Charles, "I was sure we should be in excellent time. Kempton knew better than to let 'Master' arrive first."

"Here it comes, here it comes!" exclaimed Ernest joyfully; and in a moment after the loud ringing of the bell announced that the train was in sight; and now, who should first see papa? What a rush along the platform, and eager looking in at all the windows! There, now the doors are open. Oh, Arthur has found papa, and the children crowd so eagerly round him that Mrs. Grenville is obliged to stand back, and wait for her greeting till their first ebullitions of joy have subsided.

"Come, come, children," said Mr. Grenville, shaking

them off good-naturedly, "stand back, I want to see to mamma and my luggage."

"Mamma and your luggage! Oh, papa, the idea of putting them together. There, see John has collected a great pile, so now you can attend to mamma altogether."

"Any thing more, sir?" said John, touching his hat.

"No, that is all. Now, mamma;" and in a few minutes the little party were seated in the carriage listening to papa's adventures, and telling him all that had taken place at the Grange during his absence; amongst the rest, that mamma was going to tell them all about the steam-engine, and that he was to make the models; a particularly gratifying announcement, as papa said, to a tired man, at the end of a long day's journey.

CHAPTER II.

Watt turns his attention entirely to the perfecting of the steam-engine; his difficulties; his success—Watt at Birmingham—Old age—Death.

"Now, mamma," said Arthur, when the children were in the study, a few days after Mr. Grenville's return from Paris; "now that papa has come home, you will be able to get on famously with Watt's life. He will be able to explain to us all that you do not understand."

"I am sure I hope he will," replied Mrs. Grenville; "for, as I told you at first, I know very little of scientific subjects."

"But you can tell us the story, Aunt Helen, and that is worth a hundred scientific dialogues," exclaimed Charles; "give me the results, and I do not care so very much to know how they were obtained."

"Oh, Charles," said Arthur, in a tone of such reproachful surprise, that neither Mr. nor Mrs. Grenville could help laughing; and Mrs. Grenville added, "You

remind me of a story that Arago tells of a professor of geometry, who was taking the greatest pains to explain various problems to his pupils. 'Why do you give yourself all this unnecessary trouble?' exclaimed one of the party; 'we trust you entirely; only give us your word of honour that what you say is true, and we want no further explanations.'"

Charles laughed, whilst Arthur added very gravely, "That would have been a very unsatisfactory way of learning to me, mamma."

"It would, indeed, my love. I only told you the story because I thought it was so appropriate to Charles's remark, but I should be very sorry that you should imitate the lazy pupils of the unfortunate professor. I would far rather you should follow the example of our hard-working friend, James Watt."

"What did he do, mamma, when he reached London?" said Ernest. "He must have been rather tired with his long ride, I think."

"His first anxiety," continued Mrs. Grenville, "was to find some really scientific man, at whose workshop he could not only learn the mechanical portions of his business, but be taught the principles on which instruments were constructed. Fortunately his friend, Dr. Dick, had given him an introduction to a Mr. Short, through

whose influence Mr. Morgan, a mathematical instrument maker of some fame, was induced to give Watt an opportunity of trying his powers. He was not long in discovering that his new pupil was possessed of very unusual abilities, and readily agreed that, for a sum of twenty pounds, Watt should spend a year in London, under his own immediate tuition. James was delighted with the plan, and set to work with a hearty good will to improve his present advantages, making such rapid progress as quite astonished Mr. Morgan. The first in the morning, the last at night—James was always at his post, employing the extra hours, when he was not bound to his master, in procuring for himself the very frugal means of support, which were all that he allowed himself. Stint himself, however, as he would, he found he could not live on less than eight shillings a week, and even for this sum, small as it seems, he did not like to ask his father. It was a hard trial at the time, but I have no doubt it greatly contributed to his future success, by giving him habits of self-denial and patient endurance. Only twice in the whole year did Watt allow himself to deviate in any way from the strict rule of life that he had marked out for himself. He went to see the king, on his arrival from Germany; and he could not resist the temptation of going to hear the

war proclaimed at Temple Bar, a ceremony very much more attractive then, than it is in our matter-of-fact days, when we are inclined to think every thing absurd, that is not practically useful in a moneyed point of view. At length, however, poor James's health fairly gave way, from incessant work and from rigorous self-denial. A change of air and scene was clearly essential to him, and he decided upon returning to Glasgow, hoping that the ride home would do much to re-establish his health. Either that, or the return to his native country was most beneficial to him, and Watt with renewed strength and spirit began life for himself.

"A most unexpected difficulty, however, met him at the onset. The old-established workpeople of Glasgow were so jealous of Watt, considering him as an interloper, that they positively refused to allow him to open a shop within the precincts of the city walls; but their ill-natured jealousy proved in the end of the greatest possible service to him. Dr. Dick, and other of the Glasgow University men, resenting the injustice done to their young friend, offered him a room in the college itself, and gave him all the employment that they could, with the title of 'Mathematical Instrument Maker to the University.' But it was not only in a pecuniary point of view that this was an advantage to

Watt, it was still more so from the opportunity it gave him of being constantly in the society of clever and scientific men, and thus affording him the best means possible of acquiring fresh knowledge, and pursuing those studies which were to result in a discovery destined to be one of universal benefit. Watt had been for several years settled in Glasgow, when he was asked to look at the model of a steam-engine which was quite out of repair, and which one of the professors of the University was anxious to have put into proper working order. Watt complied with the request; he saw directly what was amiss, and gladly undertook the commission of putting the machine to rights. In a short time it was working better than it had ever done before. Not content with this first success, he now became anxious not only to repair, but to improve. He saw clearly that, to gain power and to save expense, it was necessary to invent some plan by which the steam might be rapidly condensed, and he determined to try whether his boyish experiments might not at last be turned to some practical account. To ensure the success of his plan, it was necessary to find some method of preventing the waste of steam in the cylinder, and it occurred to him that this might be successfully done, by condensing the steam in a separate vessel, which

should communicate, by means of a tube, with the cylinder; thus the cylinder itself might be kept always to one equal temperature, and there would be no waste of the steam by the necessity for cooling it."

"I am not quite sure that I understand now," said Arthur thoughtfully.

"Wait one moment, mamma, if you please," said Mr. Grenville, "I think I can show Arthur a diagram, which will make what you have said clearer to him;" and going to the bookcase, Mr. Grenville took down a volume, and opening it at a plate representing a steam-engine, he proceeded to explain to the children its different parts. (See diagram and references, pages 30, 31.)

"Oh, thank you, papa," exclaimed Arthur, as Mr. Grenville finished his description; "I understand all that mamma has been saying much better now."

"You must remember, however," continued Mr. Grenville, "that the drawing I have just been showing you, is of an engine in a much more perfected state than it was at the time of which mamma is speaking. We must not interrupt her longer now, but after dinner I will show you some drawings of the engine in its various stages of improvement, then you will be better able to judge of the wonderful talent of our great engineer."

REFERENCES TO THE SECTION OF WATT'S STEAM-ENGINE.

A The boiler, with the furnace beneath.

B A pipe leading from the boiler, and connecting it with the cylinder C.

D The piston and rod. (The piston is the lower part which fits into the cylinder.) The pipe B is so contrived that it can admit steam from the boiler into the cylinder, either above or below the piston alternately. Next, observe a vessel surrounded by cold water, and connected by a pipe with the cylinder.

S The tube of a pump on the common principle, having its piston and rod connected with the great beam: this beam moves on a centre.

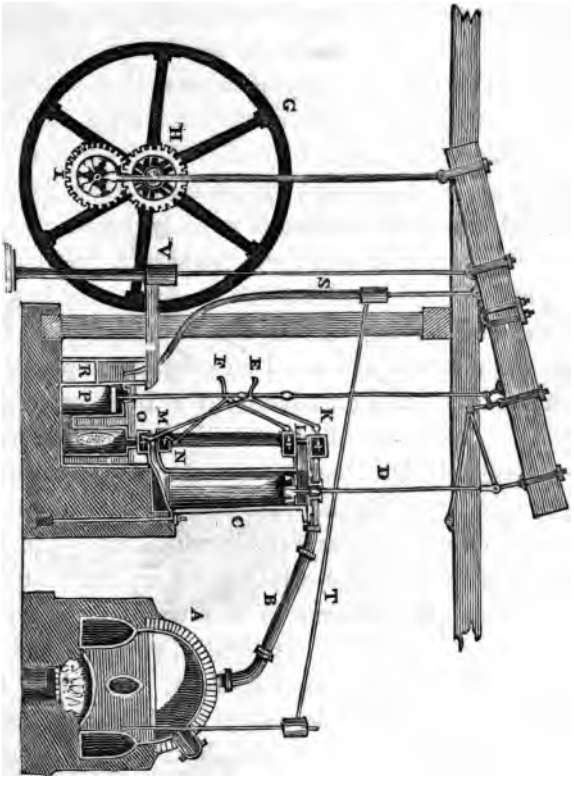
V A pump supplying the vessel of cold water referred to above.

T The connecting tube from the pump S to convey the water into the boiler.

G The fly wheel of cast iron, and of great weight, which, as it revolves, makes the motion of the whole engine uniform.

H The sun and planet wheels.

The communication being opened from the boiler to the under part of the steam cylinder C, the steam forces the piston up, and at the same time the air pump P causing a vacuum in the condenser connected with it, the steam rushes into the condenser, and now a vacuum is formed *beneath* the piston, at which moment the steam enters *above* the piston, and is in like manner drawn off and condensed; and thus the pressure of the steam acting alternately on the under and upper sides of the piston, a *reciprocating* motion is given to the beam, which will continue as long as the steam is produced.



Section of Watt's Steam-Engine.

"Oh, thank you, papa, I shall like that," exclaimed Arthur; "go on, mamma."

"Watt having satisfied himself," continued Mrs. Grenville, "of the accuracy of his new idea, set steadily to work to reduce it to practice, and after months of patient labour constructed a model which far more than realized his most sanguine expectations. But the great difficulty was how to make it publicly known. Watt was still a very poor man; work as hard as he would he thought it a good year in which he cleared two hundred pounds, and having a wife and children to support, there was not much to spend on scientific experiments. Fortunately he was introduced to a Dr. Roebuck,—a very able man,—who had established some iron works near Glasgow. Dr. Roebuck saw at a glance the value of the discovery which Watt had made, and readily agreed to enter into a partnership with him, by which he was to bear the expenses, whilst Watt superintended the construction and working of the engines. This arrangement would have answered admirably, had not Dr. Roebuck's affairs become suddenly so involved that he was utterly unable to carry out his share of the agreement, and Watt found himself in a worse situation than before; as some idea of his great improvement having got abroad, other mechanics were endeavouring

to forestall his invention, and rob him both of fame and profit, before he could protect himself by taking out the necessary patents. In the midst of all this trouble a greater affliction still befell poor Watt, in the sudden death of his wife,—a clever, high-spirited, loving woman, and one admirably fitted by her peculiarly hopeful character to cheer on her husband, who was apt when left to himself to lose heart, and be easily depressed. Her death was a terrible loss to him, and one which for years he sincerely mourned. In reading a memoir which has been lately published of Mrs. Schimmelpenninck, I found a curious anecdote relating to this sad period of Watt's life. She says, that he was staying with an intimate friend, a Mr. Macgregor, whose little daughter Anne, being one day in the room with her father, was much touched by seeing Watt's grief; and hearing the sorrow he expressed for his wife's death, she went softly up to him, and laying her hand on his arm, she looked up in his face, her eyes quite full of tears, and said very gently, 'Do not cry, I will be your little wife, and I will make you so happy.' Touched with the child's gentle sympathy, Watt took her in his arms and kissed her, little thinking that when some years had passed away, her words were indeed to be fulfilled, and that loving child was to become his devoted wife—the charm and comfort of his declining days.

"Happily for Watt, just at the very time when, overwhelmed with anxieties, he might have lost all interest even in his favourite pursuits, he was roused to fresh exertion by the offer of a very clever man, a Mr. Boulton, owner of extensive iron works near Birmingham, to buy up all Dr. Roebuck's share in the partnership, and then to enter into an agreement with Watt himself, which would enable the engineer to carry out his plans under the greatest possible advantages. This was far too good an offer to be refused, for not only was Mr. Boulton a man of wealth and intelligence, but he was possessed of a singularly noble nature, just fitted to appreciate a character like that of Watt's. Some years before this time, in 1768, Mr. Watt had paid Mr. Boulton a visit at his iron works at Soho; they had had long conversations on the steam-engine, and Mr. Boulton had been particularly struck with many of Watt's observations as to the improvements he meant to carry out. Watt's plans were interfered with, as I have told you, by the embarrassments of Dr. Roebuck, and very possibly Boulton may have thought he had relinquished his designs, and therefore he had better try and improve his own engines himself. It happened that a friend of Watt's, Professor Robison, paid Mr. Boulton a visit at Soho. In course of conversation, Robison

mentioned that Watt was intending to take out a patent for such and such inventions. Boulton took no notice at the time, but after dinner, as he was accompanying the professor round the works, he pointed to some brick-work just erecting. 'You have stopped that,' he said with a quiet smile.

"'How so?' asked Mr. Robison.

"'Because I was just going to erect an engine there, not quite like what we have been talking about, but still with a variety of improvements, founded on those Mr. Watt mentioned in conversation. If he means to take out a patent, it would not be fair in me to construct my engine without his consent.'

"A partnership between two such men as Watt and Boulton was sure to succeed, and through life it was advantageous to their characters, and drew out the best qualities of each. As soon as all arrangements could be made, Watt left Glasgow, and settled at Birmingham, which town became from henceforth his permanent home. He had not, however, been long established in his new abode, when he received a most flattering offer from the Russian government asking him to go out and superintend some engineering works which were then in progress. Had this offer arrived a little sooner, it is only too probable that Watt, tempted by the salary of

1000*l.* a year, might have been induced to accept the appointment, and England would have been deprived of one of her most valuable men; but fortunately, Watt was much too happy at Birmingham, in the midst of pursuits and surrounded by society exactly to his taste, to care to relinquish them for an immediate increase either of fame or of fortune. He declined the tempting offer, and set to work even more diligently than before, to attain the one great object of his ambition, the perfecting of the steam-engine.

"Having once assured himself that his principle was right, and that by the condensation of steam in a separate vessel, the action of the piston within the cylinder could be rapidly and regularly performed, with the smallest possible waste of fuel, all the rest was comparatively easy; one improvement suggested another, until at length an engine was built, so perfect that it did more than perform its allotted work, for it succeeded in upsetting the ignorant and vexatious opposition that Watt had hitherto met with in all his undertakings. Men at length recognized the wonderful power thus placed at their command, and began to have some notion of the change which in a short time was to be effected in all the mercantile transactions of Great Britain. Whilst, however, people are extremely delighted with

an invention from which they expect to derive great use or profit, they are very seldom grateful to the inventor himself, or anxious that he should reap the benefit of his own success. No sooner was the superiority of Watt's engine fully admitted, than engineers were starting up on all sides, bringing out what they were pleased to call improvements of their own, but which were in reality nothing but imitations, and often bad ones, of their great master. The consequence was, Watt and Boulton were obliged to protect themselves by taking out patents for every improvement, however trifling, which they introduced into their engine; and as Watt's fertile genius was for ever devising something new, these patents became a most serious expense, and not only this, but they involved the partners in endless lawsuits, the vexation and annoyance of which were even harder to bear than the actual loss of profits, until at last Watt wrote in despair, 'That he almost wished that he had never made any inventions at all, for that nine-tenths of mankind were knaves, and a large proportion of the remaining one-tenth fools.' However, his better nature conquered, and he added, 'All will be well in the end; we must do the best we can on earth, and look for rest in heaven.'

"Never having been of a strong constitution, it is only

wonderful that Watt was able to bear the immense amount of work thrown upon him at this time. He used sometimes to laugh and say, it was a pity he could not be cut up into little bits and sent into all the different parts of England, for he found there was no use in sending away his engines, even with the clearest directions, and under the charge of his most intelligent workmen, without he himself went with them to superintend their erection. The consequence was, that to his great annoyance he found himself obliged to be constantly absent from home; and amongst other places, he was kept for weeks together in Cornwall, a country which he peculiarly disliked, and which seemed to him the *ultima Thule* of civilization. The rough manners of the Cornish people jarred against his gentler nature, and he naturally enough missed all the scientific society to which he was accustomed in his own home. So little did even the owners of the mines understand of the true principles of science, that when Watt, having erected an engine somewhere in the neighbourhood of Truro, was very busily trying to rectify the extreme noise that the engine made in working, its owner came and begged him to desist, seeming to imagine that if the noise lessened, the engine's power must of necessity lessen with it. No wonder Watt wrote to Mr. Boulton half amused

and half angry, 'The velocity, violence, magnitude, and horrible noise of the engine, seem to give universal satisfaction;' and then alluding to the strange request that the gentleman had made to him, he added, 'As he cannot sleep without the engine seems quite furious, I have left it to the engine-man;' and it was allowed to thunder on, to the delight of all beholders.

"Watt, however, was not a man to let a desire for personal comfort interfere with what he considered to be his duty. In spite, therefore, of his dislike to the Cornish workpeople, whom he declared to be such barbarians, as even to eat the grease intended for their engines, he stayed steadily on where he saw his presence was needful, and he had his reward. Whilst other persons' engines were performing the most extraordinary feats, 'some,' as he said, 'standing still every ten minutes to snore and snort, others of such a gentlemanly turn of mind, that they would go when they had nothing to do, and stand still the instant they were required to work, and others again, blowing up altogether, destroying themselves and every thing near them,' Watt's engines were every day gathering fame and reputation; mines which had been thought to be hopelessly flooded were pumped perfectly dry, and facilities given to the workmen such as had never entered into their wildest

imaginations; and in a short time there was only one mine in Cornwall that was not worked by Watt's engines."

"But, mamma," said Ernest, "were the engines that Watt invented only meant for mines; did he not make railway engines and things of that kind?"

"No," replied Mrs. Grenville; "the construction of the locomotive comes under quite a different branch of his art; and the working out of this fresh problem was reserved for another brain, as vigorous and as fertile in inventions as Watt's own; not but that Watt had some notion of the great discovery on the verge of which he stood. He felt convinced that all that he had done was only the beginning of changes, and his attention was particularly drawn to the subject of locomotives by a letter from his friend, Mr. Edgeworth, in which he said, 'he felt sure that in time, steam would take the place of post horses, and the best turnpike road would be an iron one.' But the time had not yet come for such a bold idea to be acceptable. At this moment the thoughts of the English people were intent on Napoleon and his doings; they had too much to do to defend their own, to be able to give their attention to the startling propositions of a few scientific men, and so Watt made his little model of a locomotive, and it reposed tranquilly in the workshop at Soho;

and people looked at it, and little dreamed of the wonderful change which in a few short years it was to effect in the whole social and commercial world. It would be endless to endeavour to describe to you all the various machines which Watt delighted to contrive: it was the great amusement of his old age. One of these ingenious toys was an arithmetical machine."

"Oh, and would it do sums all by itself?" interrupted Charles. "Do not I wish I had got one in the study, would it not be jolly?"

"Very jolly indeed, I dare say," replied Mrs. Grenville, "but not very improving. Another of these machines, and one on which he bestowed much time and thought, was intended to supersede the labour of chiselling. He believed he could make it do its work so accurately that it would carve the stone entirely by itself; and he was charmed when he and his engine turned out between them a really beautiful bust in alabaster of Sappho. He did not live long enough to perfect his invention; but it is from the model of 'his Benjamin, his youngest and best beloved,' as he called it, that mechanics of the present day have made the machines which now carve wood and other substances with wonderful rapidity, and almost with the precision of the hand. In the enjoyment of these his favourite

pursuits, Watt passed all the last years of a happy and peaceful old age. One deep sorrow he had in the loss of his son Gregory, a young man of unusual talent, who died when he was only twenty-seven; just at the moment when Watt was most rejoicing in the promise of his future celebrity and success. But happily for him, he did not sorrow as one who had no hope; he could rest in the assurance that he whom he had loved so fondly and so proudly, 'was now rejoicing in another and a better world, free from our cares, griefs, and infirmities; and that his name, his merits, and his virtues would still live amongst all those who had ever known him.' In the same calm spirit of resignation he awaited his own end. Always cheerful, entering into the amusements and pursuits of those around him, and with affections and sympathies as warm at eighty-four as in the prime of life, he charmed every one with whom he came in contact; philosophers, poets, men of letters, mechanics, the idle or the busy, rich or poor, all delighted in James Watt, and thought the day a happy one in which he made one of their party; and when, at length, on the 19th of August, 1819, he calmly and tranquilly breathed his last, his death left a blank which could not easily be supplied. Statues were erected to his memory; and the wisest and best men of

all nations mourned his loss. But we may hope that they should rather have rejoiced, for that he is now in possession of such happiness that he would not relinquish its smallest particle, for the possession even of an earthly fame, which will endure whilst the world lasts."

"And he was once a poor little delicate, weak boy," said Arthur thoughtfully.

"Yes, my love," replied his mother, knowing well what was passing through his mind; "God chooses the feeble as well as the vigorous to work in His vineyard. His temple is made of many stones—there is room for all."

"Never fear, Arthur," said Charles, "we shall see you a second James Watt one of these days."

"I am afraid not," replied Arthur, with a half-sigh, "and besides, by the time that I am grown up, there will be nothing left to invent."

"I do not think that you need disturb yourself about that," said his father. "The more that is known on all scientific subjects, the wider still the field opens for fresh experiments. Of many of the wonderful agencies which God in His wisdom has given to nature, for the good of man, we at present, comparatively speaking, know but little; and it has often seemed to me one

of the most striking proofs of the omniscient presence of the Creator, that men are so gradually permitted glimpses of that knowledge, which can only be perfected in the presence of God."

"And there is another point, which seems to me equally remarkable," added Mrs. Grenville, "that every fresh discovery just comes to meet the rising want. It is when men have multiplied upon the earth; when their necessities have so greatly increased, that it seems impossible to say how they are to be met; then come new powers to light, supplying all deficiencies and opening out fresh means of support to all. However, to enter into a discussion on the power, the wisdom, the overruling providence of God, would, I am afraid, take us into subjects too deep even for our earnest little philosopher," added Mrs. Grenville, as her eyes caught the expression of Arthur's, which were fixed upon her with a calm, thoughtful look. "You will find life all too short to understand these subjects, and eternity scarce long enough to grasp their full meaning."

"But I like to think about them, mamma," said Arthur.

"And I like that you should do so," replied Mrs. Grenville; "but not to perplex and overexcite your brain. You must run away now, and have a good

game of play with Charles and Ernest; that will be infinitely better for you than pondering over the wonderful discoveries with which you mean to electrify the world."

"Mamma, you are laughing at me."

"No, indeed, I am not; but I want you to have a good run before the sun sets; and besides, I am going out immediately with papa."

"Papa, you have not forgotten your promise, have you?" asked Arthur, as he came into the dining-room after dinner, on the evening of the same day.

"No, that papa has not," exclaimed Ernest; "look at those great books on the sideboard. I know what they are; they are all those plans of the engines Mr. Elliott sent papa."

"You may bring them here, Ernest."

Ernest was not long in obeying; and Mr. Grenville showed the children the different plates, describing the various parts of the steam-engine, and explaining the gradual improvements made from the time of Solomon de Caus, until the last great discovery of the condenser by Watt.

"It is all very well," said Charles, "to look at these prints, and I have looked at them as attentively as possible, but I cannot make much out of them. If I

could see one real live engine at work, it would be worth a thousand drawings."

"Mamma, what are you laughing at?" asked Ernest, looking up in his mother's face.

"I—I was not laughing at all."

"Not out loud; but your eyes were laughing, just as they always do when you know of some pleasant surprise."

"Ah, mamma's eyes are sad tell-tales," said Mr. Grenville; "so as she has betrayed half my secret, I may as well let you know the remainder; that I have been so pleased with the report Mr. Harvey makes of your conduct since I have been away, that, as a reward, I have written to-day to Mr. Elliott, to ask whether I may take you all to pay a visit to his copper mines, and there you will be able to judge for yourselves of these wonderful engines, of which mamma has been telling you."

"Oh, uncle!" "Oh, papa, how jolly! how charming!" "Oh, that will be fun!" exclaimed the children in different tones; and Arthur added, "But mamma is going too, I hope."

"Oh, certainly, our party would be very incomplete without mamma."

"And how are we to go, uncle?" said Charles.

"Why, Mr. Elliott's mines are right at the other end of Cornwall; are they not? We shall be ever such a time on the road."

"We must go by train as far as we can, and then post the rest of the way."

"Oh, what glorious fun! I do like posting so," exclaimed Charles. "And I shall go on the box with Kempton; that is the jolly place."

"Others may think so besides yourself, Charles," said his aunt rather gravely.

Charles blushed. "Well, part of the way, Aunt Helen."

"That is quite a different thing; we will see about that when the time comes; at present we have not even got Mr. Elliott's answer."

"Oh, it is sure to be all right. Do not you think so, mamma? Mr. Elliott almost always does just what papa likes."

"I have not very much fear, certainly, about his answer; only it is just possible Mr. Elliott may not be at home, in which case we might be obliged to delay our visit; so I advise you not to count upon it until we are quite certain."

It was easy to give this advice; but it was difficult to follow it. The children could think and talk of nothing

else; and so endless were their inquiries, as to where they were to go, and what they were to see, that at last Mr. Grenville's patience was fairly exhausted, and Mrs. Grenville was obliged to carry them off with her to the drawing-room. "Ah, papa," she said, as she passed him, "I warned you of this, and you would not believe me; see what comes of not being able to keep your own counsel."

"And this to me!" returned Mr. Grenville; "you, who actually betrayed my secret."

"Did I? Well, I will make you the only reparation I can, by leaving you to peace and quietness, your wine and walnuts;" and closing the dining-room door, Mrs. Grenville followed the children into the drawing-room.

CHAPTER III.

The spinning-jenny—Hargraves—Arkwright.

THIS was Tuesday; on Thursday an answer might be received from Mr. Elliott. Oh, how anxiously the children looked for the arrival of the post-bag! There it lay on the breakfast-table, looking so fat and comfortable; was the much wished-for letter amongst its contents? Alas! no. The bag was gradually emptied, but no Cornwall post-mark was to be seen; and although Charles made a secret search, hoping that the letter might be hiding itself in some out-of-the-way corner, it was all of no use; clearly Mr. Elliott had not written. The children tried not to express their disappointment, at least whilst Mr. Grenville was in the room; but they imparted their hopes and fears to Mrs. Grenville, as soon as they found themselves alone with her. Mrs. Grenville, however, could only bid them have patience. Mr. Elliott was sure to write as

soon as he was at liberty; in the mean time, they must amuse themselves with other pursuits, and not tease their papa. To do the children justice, they tried hard to be patient, and even when Saturday morning came, and still no letter, they only looked forward to Monday, and hoped cheerfully on. They met with their reward; on Monday arrived the anxiously desired despatch. Mr. Elliott had been in London, and had only just found Mr. Grenville's letter on his return home. 'He did not lose a post in saying how delighted he should be to do the honours of his mine, to as large a party as Mr. Grenville liked to bring. He was only sorry his house was not large enough to accommodate all the party; he could take in Mr. and Mrs. Grenville, and the children, he had no doubt, would do very well at an hotel close by. He had no engagements; they might come as soon as they liked.' Nothing could be more charming; and the children's delight reached its climax, when Mr. Grenville said they should go that day, by an afternoon train, to Plymouth; sleep at one of the hotels there, and be ready for an early start the next morning. There was something so very delightful in the idea of a late dinner at the hotel with papa and mamma; a pleasure they had never had before; 'why it would be almost as good fun as seeing the engine.'

There are some things, however, pleasanter in the anticipation than in the reality, and a late dinner is one of them. In spite of the children's constant assertions, "they were not one bit sleepy," it soon became evident that the excitement, the journey, and the dinner, were too much for their powers of endurance; they could not keep their eyes open, and so Mrs. Grenville sent them off early to bed, that a good long night's rest might set them up for the fatigues and pleasures of the coming day. Very early the children were astir, to see what sort of a morning it was; nothing could be more beautiful; just enough of summer left to make it warm and bright, and yet with that clear crispness in the air, which makes the early autumn so fresh and invigorating. At present there was a slight mist hanging over the distant view; but that was all right, it would clear off and be all the more beautiful day; at least, that was Kempton's opinion, as punctual to a moment he brought the carriage round to the hotel door, and in a few minutes after, the little party drove cheerily off, Ernest and Charles on the box with Kempton, Mary and Arthur inside the carriage with Mr. and Mrs. Grenville. At first the children's exuberant spirits broke out into all sorts of fun and nonsense, then sobered down into occasional exclamations

of astonishment or delight, as the carriage passed any thing unusually novel or beautiful, and at length, by the time half their journey was accomplished, they had come to the conclusion, "Mamma was right after all; travelling was rather tiring, even in an easy carriage and with four good posters." A substantial dinner in the middle of the day helped to restore their energies; but still, all the party were glad to find themselves, before night, in the comfortable rooms Mr. Elliott had engaged for them at Redruth; a warm cosy fire in the grate, and a delicious looking tea spread out upon the table, with a profusion of Cornish delicacies. A good night's rest worked wonders as a restorative; and in the highest possible spirits, the children started in company with Mr. Elliott and their parents, to pay their eagerly anticipated visit to the mine. Greatly, however, as their expectations had been raised, they found the reality even more wonderful than they had expected, and thought they never should be tired of all the marvels of the strange new world, in the midst of which they suddenly found themselves; such crowds of people, men and women, boys and girls, all so actively employed; no one interfering with the other, and all doing their allotted portion of the one great work. And then those marvellous machines: here

great wheels solemnly and slowly revolving, as if fully impressed with the dignified sense of their own importance; there great skeleton-looking platforms, half ashamed of their nakedness, and of the perpetual groanings of the iron chains, which clanked for ever over the pulleys as they bore up and down their appointed loads; and then the underground puffings, and pantings, and roarings. Why, what was going on beneath their feet must be even more wonderful than that at which they were now looking.

"You must go down presently and judge for yourselves," said Mr. Elliott.

"Oh, mamma, I may go, may I not?" said Arthur, as he looked up entreatingly into his mother's face.

"No, my love, not you; you must stay with Mary and me."

"I do not think it would tire him," said Mr. Elliott; "we can get down so much more easily now, than we did when you were last here."

"Can you? How?"

"Then, if you remember, we went down by ladders to a platform, and then through a trap door to another ladder."

"Oh yes, I remember," replied Mrs. Grenville, "and my terror likewise, at seeing Henry disappear."

"Well, but now we have got a new plan, and an admirable one it is. It was originated by a remarkably clever German miner, who at one time, when the pumps were not working in the mine where he was employed, hit upon the very ingenious idea of making the pump rods employ their spare time in facilitating the ascent and descent of the miners. He so arranged it, that at certain intervals there should be steps and firm hand-holds; the rods were set in motion from above, whilst one descended the other ascended, and the miner was carried to a higher or lower elevation, simply by shifting himself from one bracket to the other. But come here, I will show you the machine at work. You will understand the principle of the thing in a moment, if you see it, and you will judge what a wonderful saving of fatigue it is to the miners. It has been very much improved, however, since the German first conceived the idea; now we have fixed platforms at intervals of twelve feet, and in many respects the machinery has been simplified and perfected; but still the credit of the discovery is due to the poor miner. Here,—here we are at the mouth of the shaft, now you can see for yourselves how it acts."

"Oh, uncle, how funny! do look," exclaimed Charles. "Did you ever see any thing so comical as this stream

of men going up and down? I declare it quite dazzles me to look at them. Look, look! as fast as one gets off the platform, another gets on. How fast they come! Oh, I shall like going down there; will not you, uncle?"

"I shall be very glad to take you down, as you wish so much to go," replied his uncle; "but as a matter of taste, I must confess I like the pure air better than the interior of a mine."

"And may I go, mamma, now you see it is not so difficult as it used to be?" asked Arthur.

But Mrs. Grenville still refused. Arthur was so delicate that she did not wish him to run the risk of the damps and chills he must of necessity meet with in the mine. And Arthur, when he saw his mother really disliked that he should go, gave up his pleasure so readily, and stayed so contentedly by her side, that Mr. Elliott was more than ever charmed with the quiet little intelligent fellow, and invited him to spend the evening at his house, when he promised to show him the model of the interior of the mine, with little figures at work just as they would be at that very moment, in reality; "and you will get a very good notion of it, my boy," he added.

"Yes, and without the damp, and dirt, and fatigue," added his father; "you are a lucky fellow, Arthur."

"And you are a very lazy one!" added Mr. Elliott laughingly, as he prepared to follow his friend and the boys into the mine.

For some little while Mrs. Grenville stayed with Arthur, watching the ascent and descent of the miners; then fearful that a heavy cloud which had gathered overhead, might suddenly discharge itself in a down-pour of rain, she called him away and hastened on towards some cottages where she felt she could take refuge, if necessary.

"Oh, mamma," exclaimed Arthur, "look at that funny dog. Do look; what is he doing?"

Mrs. Grenville turned in the direction indicated. There in the middle of a group of bright, pretty children, was a grave Skye terrier, looking irresistibly ludicrous, as perched upon his hind legs, his front paws hidden by the masses of hair which fell over his head, shutting out all appearance of eyes, he moved backwards and forwards at the word of command, like some strangely animated ball of silk. Seeing that their little favourite had attracted the notice of the strangers, the children put him through all his tricks, and Arthur was so infinitely diverted in watching the exhibition, that the threatening shower was forgotten, and it was not until some large drops fell, that Mrs. Grenville sud-

denly remembered they were still some way from shelter.

"Come, Arthur, come quickly, my love, we must make haste and get under cover."

"Please will you come to our cottage?" said one of the children, looking up; "it is quite close. Here, Shag, Shag, run on as fast as you can, and tell mother a lady is a coming; run on, Shaggy, I will catch you;" and as if he understood his message, on scampered the mass of hair, barking out his cheerful welcome, whilst his little mistress ran merrily after to see that all was ready for her guests.

"Come in, ma'am, come in, you're kindly welcome," said a clean, decent-looking woman, as she held open the garden gate; "you be only just in time, it is like to be a heavy rain."

"It is, indeed!" said Mrs. Grenville, as in a moment after the rain swept in a perfect hurricane across the upper moor land, and shut out even the great tall engine chimneys from their view. "We have to thank you very much for giving us shelter; my children were so amused watching your funny little dog, that we forgot all about the rain."

"Ah, Shaggy, he is a great pet; he belonged to my poor boy, and now he is gone we let the dog have pretty

much his own way. Father says we make a fool of him, but I do not know, Shag seems to understand most things we say; I often think he has more sense than many a Christian."

"Has your son been long dead?" inquired Mrs. Grenville kindly.

"Oh bless you, ma'am, he is not dead, he is away over the seas getting his fortune. It is what he was always a hankering after, so I ought not need to fret, but somehow he seems lost to me in they Amerikay mines, just as much as if he was in his grave. It is well father does not hear me say so, he would be blaming of me for my want of faith and gratitude, and right enough too, for it was all along of God's mercy and goodness that Will went away."

"How was it, may I ask?" inquired Mrs. Grenville, amused by the woman's natural manner.

"Ah, sure you be strangers and do not know, but it is a story as has been well talked on in all these parts. You see, ma'am, my Will was an uncommon steady young man; although I say it, there were not many like him in the mine, regular at his meeting, always fond of his Bible, and never known to take a drop too much. Many a one joked him and called him saint, but Will did not mind, he used to take it all good-humouredly, and

say 'he was sure the saints would have the best of it in another world, and he did not know but that they might have the best of it in the long run here below.' Well, one day, it may be a matter of seven years ago, Will and one of his companions, a sad unsteady chap, were hard at work in one of the mines preparing for a blast; and you see, ma'am, it is sharpish work. As soon as the blast is ready one goes up in the basket and sends it down again for his companion, who sets fire to the train and then hoists up for dear life. Well, it so happened on this particular day Will's companion had charge of the match, and he thought it was not quite the right length like, and so he must needs be altering it. In cutting it short he struck a light; in a few moments the blast must follow; there was the basket sure enough; it would only save one, the other must stay behind and die. 'In, Jem, quick,' said Will, 'go you up and repent, before you are at the top I shall be in heaven.' Up went the basket, and before Jem could get to the top he was cut by some of the stones, thrown upward by the blast. Frightened amost out of his senses he tells the tale, and then they go down again to pick up my poor Will's mangled remains. Not a bit of it; God was in the blast, though they did not know it, and He saw where His

servant was, and the scorching fire went by him, and like those three Jews the Bible tells about, he came out, and the smell of the fire had not so much as passed upon him[1]."

"Oh, how glad I am!" exclaimed Arthur, who had been eagerly listening to the story. "I am so glad God took care of him."

"Ah, indeed! It would have been a sad day for us had he died. And then, you see, this story got wind, and people came from a great distance to see Will, and Will said he thought he was in greater danger out of the mine than in it. He said he thought there was more harm in the breath of praise than in the blast of fire, and he found it mighty hard, he said, to keep his footing and not be puffed up. And then there was Mr. Elliott, and our minister, and one or two others, and they talked of making him a reward, and Will said he did not want a reward. Was he not rewarded already? God had given him his own life and his companion's likewise. But when he saw as how they were bent on doing something, then he upped and let out the secret of his heart; he wanted schooling, he wanted to be an engineer; and so all his friends clubbed together, and they sent him somewhere

[1] The idea of this story was given by an anecdote related by Carlyle in his "Life of Stirling."

where he got a deal of learning; and then he heard of employment out beyond the seas, in Amerikay; you know where that is, I dare say, better nor I do, and he is gone out, and right glad I shall be when he comes back again."

"Oh, I wish I had got my ball here, mamma," exclaimed Mary, "then I could show her America, and tell her just where her son is."

"They did show me a map I think they called it, but I could not make much out of it; one piece of paper is just the same to me as another."

"Oh, but you would understand mine," said Mary, "because mine is round, just like the world; the world you know is only a great big ball, and Arthur drew all the lines, and they are all right; I know you would understand it if I were just to show it to you. What a pity I did not bring it with me! but I could send it, mamma, could I not?"

"Bless you, dear," said the woman kindly, "but it would not be of much use to the likes of me; please God I shall live to see Will again, and then I shall not much mind where he has been to meanwhile."

Mrs. Bolton's thirst for knowledge was certainly not as ardent as her son's had been. Her thoughts were more intent upon present hospitalities, and seeing that

the rain was steadily falling she insisted on her guests staying to take tea; and whilst Arthur and Mary had a game of play with Shaggy, she and her granddaughter Jane spread the table, and covered the clean white cloth with all the delicacies their larder contained. "She was sure," she said, "a few potted pilchards, and some bread and cheese, and a good draught of cream would do the young gentleman good, he looked but weakling, and he was heartily welcome to every thing that they had, and if that was not enough she knew where she could get more." But when Mrs. Bolton finished her hospitable preparations by taking from the cupboard a loaf about the size of a moderate pillow, Arthur could not help laughing as he said, "He thought there was quite enough there to satisfy him for a month at least."

"A month! You should see how my boys eat. It is not long these loaves last them."

Not to vex Mrs. Bolton, Mrs. Grenville just tasted some of the nice things offered to her, and then proposed, whilst the children were finishing their meal, to make a little sketch of Shaggy sitting up begging, as they had first seen him. This proposal gave universal satisfaction. Mrs. Grenville drew remarkably well, and in a very short time she had made such a bold,

spirited sketch, as might have met with the approval of even a Sir Edwin Landseer. In the cottage it was hailed as a perfect masterpiece of art. At first its progress had been watched in solemn silence; then as the finishing touches came in, "Dear, oh dear, to think of any thing so wonderful! Why, it is just the very pictur of the dog. Why, there is his shaggy hair, and no eyes, and just his nose, and they are his very paws. Well; to be sure. I never!"

The rain had ceased, and the men had come in from their work; and before Mrs. Grenville had finished her sketch, she was surrounded by an admiring crowd; one and all declaring, "That to be sure, it did be the very pictur of the dog."

"Well; to be sure. But I do thank you," said Mrs. Bolton, gazing almost with reverence at the picture. "Look, father. How often you have been cross with me because I said whatever should I do if Shag died before Will came back. Now, even if poor Shag were to die, you could hardly tell his pictur from hisself. La! father, would not Will be right pleased?"

But the sun was now again brightly shining, and Mrs. Grenville was anxious to take advantage of the fine weather to go home. Resisting, therefore, the kind importunities of her host and hostess, "that she would

rest a bit longer amongst them," she thanked them for all their hospitality, and shaking hands warmly with them, left the cottage, followed by their best wishes and earnest entreaties that she would never come to Redruth without paying a visit to the miner's home. They had not long left the cottage, when they were joined by Mr. Grenville and the boys, full of all the wonders they had seen in the mine. But pleasant as it had been, they were rather tired and very dirty, and were glad to return to the hotel, to rest and refresh themselves before going to Mr. Elliott's, where they were to spend the evening of this very eventful day.

"Mamma," said Ernest, as a few days after their return from their pleasant expedition to Cornwall the children were sitting with their mother, "who did Mr. Elliott say had invented the cotton machines? That man, I mean, whom he was telling Arthur about, and who, he said, lived about the same time as Watt."

"Arkwright."

"Oh yes, that is the name. Was he as remarkable a man, mamma?"

"He was very clever and ingenious, but perhaps not equal to Watt in power of mind."

"When did he live, mamma?" asked Arthur. "Cannot you tell us something about him?"

"He was born in 1732," replied Mrs. Grenville. "His parents were very poor people, and he was the youngest of thirteen children. But, as is often the case with those who are possessed of real genius, the very hardships he had to go through, had only the effect of quickening his intellectual powers. As a boy, however, no one seems to have had an idea of the celebrity to which he would afterwards attain. He was apprenticed to a barber, and began life by shaving and cutting the hair of the good people of Bolton; wearying, however, of this somewhat monotonous trade, he changed his profession for that of an itinerant hair dealer. His business was to travel about the country, and visit the different towns, buying up all the fine heads of hair, and then dressing and preparing them for the use of the wig makers; for in those days, when every one wore wigs, it was a much more lucrative profession than it is now, when we have grown so matter-of-fact as to suppose that the head of hair nature has given us, may possibly be quite as becoming as the one intended for our neighbour. In the course of these journeys, Arkwright was in the habit of passing through all the manufacturing districts in the north of England; busy places then, though very different to what they have since become, thanks to his inventive genius.

"Up to about 1760, it had been the habit of the weavers to spin their various cloths in their own cottages, and then take them for sale to the towns in their vicinage. About this time, however, the merchants at Manchester seem to have come to the conclusion, that it would be far more profitable for all parties, if they were to supply the weavers with a certain quantity of the raw material, and pay them regular wages for making it into calicos; not such calicos however, as we use now; they were not known then; a far more costly material was used, threads of cotton and linen being interwoven; there being then no method known by which a thread of cotton could be prepared sufficiently strong to act as the warp. I do not know whether you are aware that all materials that are woven, are made of threads which cross each other. Look at my pocket-handkerchief," continued Mrs. Grenville; "or stay—here is some coarse calico. You will see what I mean, more plainly in that; one set of threads goes one way, and the other the opposite. These long threads are called warp, and the shorter threads, which cross latitudinally, are called weft. The warp used to be made of strong linen yarn; the weft, of cotton; and with this cotton the manufacturers used to supply the weavers; and they had to card and

prepare it in their own homes. At first, this plan seemed very desirable, as the preparing the cotton gave regular employment to the wives and daughters of the weavers, but soon the demand for calico increased so fast, that work as hard as they would, the women could not supply the wants of the weavers; and often an unfortunate man had to leave his home, and walk sometimes for three or four miles, inquiring at every cottage as he went, before he could procure weft enough even to last him for the remainder of his day's work. This state of things could not continue. It was evident a method must be invented by which the weft might be more quickly supplied; or it was clear, either that some other material must be found to supply the place of calico, or that its manufacture would pass into abler and more ingenious hands. Necessity may be the mother of invention, but at this time James Hargraves was certainly its father. Without having had any of the advantages of education, this very ingenious mechanic directed his attention to the best method of supplying quickly the daily increasing demand for the spun cotton; and at length, in 1767, he invented a machine, which he called the spinning-jenny, in which eight spindles were made to revolve at the same time, by means of bands from a horizontal

wheel; and thus, of course, the spinner was able to make eight threads in exactly the same time that he had hitherto made one. No sooner, however, was it seen what a saving of time and labour these machines would effect, than an outcry was raised through the whole neighbourhood—

"'The trade was in danger. The bread of the honest poor was being taken out of their mouths. Down with the machines! Down with the traitor who had invented them, and wronged better men than himself!'

"Urged on by such speeches as these, and by false representations of the ruin in which these new machines were to involve themselves and their families, the ignorant weavers rose in a body, and led by the most turbulent spirits in the neighbourhood, they marched straight to Hargraves' house, destroying his property and breaking his machines to pieces; and not content with having wreaked their vengeance on the author of their fancied wrongs, they made their way into the cottages where they knew the spinning-jennies were at work, and wantonly broke them all to pieces. They might ruin Hargraves; they might force him to leave the county, and take refuge at Nottingham; but they could not stop the success of

his invention: all that their ignorant anger could effect was to turn the rising tide of prosperity from themselves, and make it flow into another channel. Greatly surprised would those men have been, if they could have been told, on the day when they broke the spinning-jennies to pieces, and fancied they had destroyed their worst enemies, that the time was not so very distant when that very machine, restored and improved, would do, not the work of eight spinners, but that of one hundred and twenty; and that instead of robbing one poor man of his bread, it would be the means of giving employment to hundreds of others, who without it might never have had any work at all. However, you cannot hope that the poor and the uneducated will take the enlightened views of the statesman or the scholar; they feel the present inconvenience, and can hardly be expected to wait patiently for the future good. Much has been done since the days of Hargraves, to improve the moral and intellectual condition of our people; and though much still remains to do, yet I think quite enough has been effected to give us ample encouragement to persevere in our task, and it is one in which we all may help."

"All, Aunt Helen," exclaimed Charles; "what can mere boys like we are do?"

"Educate yourselves."

"But, aunt, what has that got to do with teaching the poor?"

"Every thing. Have you never felt the effects of indirect influence? Have you not known that your own thoughts were purer, and your own aspirations higher, when you were amongst those whose judgment you respected, and to whose high moral character you could at all times look up?"

"Yes, aunt, certainly," replied Charles, slightly hesitating.

"Well, my dear boy, the same influence which you now feel others have over yourself, you in your turn may exercise over others; your very position as a gentleman by birth and fortune gives you great responsibilities; you did not come into the world to hunt, and shoot, and smoke cigars, and dress well, and waltz elegantly; these amusements may be all very well by the way; but God gave you a work to do, and He will require an account of you, of how you have done it. You came into the world to win your way to heaven, and in doing so, to influence for good all those who come within your daily sphere of action. Now, more or less, the rich influence all the poorer classes. Of course there are exceptions, but as a general rule, those

below look up to those whose rank and station are higher than their own, and allow themselves to be guided by those whose conduct and intelligence they feel that they can respect; whilst on the contrary, if they see that the gentleman is only idling away existence, they soon learn to despise him; and from this contempt results subsequent riot and sedition. But then in order to rule others, you must first learn to rule yourself; and it is in childhood that the foundation of your future character is laid: whilst you are mastering a difficult lesson, or working out an intricate problem, you are in reality acquiring habits of patience and perseverance. In these days of over-work and over-stimulus, it is actually necessary that those who would influence for good the masses of the people, should be themselves possessed not only of great intelligence, but of accurate information. This can only be acquired by patient and laborious study, and he who shirks work as a boy, will very rarely have much influence over others when he is a man. However, we must return to Hargraves, whom we left with his house broken into, and his machines destroyed.

"Seeing clearly that it would be quite useless to endeavour to combat the spirit of opposition, with which the weavers of Lancashire set themselves against

the introduction of the spinning-jennies, Hargraves took the resolution of leaving his own county and going to Nottingham, hoping in that manufacturing town to find some one who would be induced to advance the money which was required to bring the spinning-jennies into general notice; for he never for a moment doubted that if they had but a fair trial, their success was certain. It would have been well if he had been equally certain of reaping the benefits of his own ingenuity. But no sooner did the manufacturers understand the immense gains they might derive from the use of the spinning-jennies, than, in spite of a patent which Hargraves had taken out in the hopes of protecting himself, a number of unprincipled men, trusting to his being too poor to defend himself, openly infringed upon his right. Hargraves brought the matter before the courts; but his opponents were numerous and rich, he was poor and unbefriended. Without money, and broken in spirit, he was obliged to retire from the unequal contest. His unprincipled adversaries reaped the benefit of his talents, whilst he himself ended his days in the workhouse at Nottingham; and that this should have been his fate, seems to me to be a lasting disgrace to the age and society in which such a wrong was committed."

"And Arkwright, was he more prosperous?" asked Ernest.

"Yes," replied Mrs. Grenville, "the conclusion of his life was a very different one; but I really have not time to talk to you any more to-day, I had no idea it was so late, and hark there is the door bell; your aunt Arthur was to call for me, and I have not begun even to get ready. Run into the hall, Ernest, and if it is your aunt tell her I will be with her in a very few minutes," and bidding the children good bye, Mrs. Grenville went up stairs to put on her bonnet.

CHAPTER IV.

Arkwright at Nottingham—Establishes the works at Cromford; their success—George Stephenson—Anecdotes of his youth.

"MAMMA," said Arthur, "I have been thinking so of poor Hargraves and his spinning-jennies. It seems so sad to hear of his dying in the workhouse whilst other men were growing rich by his inventions. Did Arkwright know about it, mamma?"

"About his poverty, or about the spinning-jenny, do you mean?"

"Why I meant about the spinning-jenny at the moment!"

"Most probably, I should think," replied Mrs. Grenville, "for Hargraves must have been busily at work in the construction of the machine at the time when Arkwright was travelling over all those northern districts. I dare say, however, they did not come much in contact, as Arkwright's employment must have taken him amongst rather a higher class of employers. Be this,

however, as it may, there seems no doubt that the same idea occurred to the two men nearly at the same period. Both saw that if the cotton manufacture was to be carried on successfully in England, some means must be at once discovered by which the cotton could be rapidly prepared. Both men set busily to work to find the remedy, but Arkwright went further than Hargraves in his ideas of improvement. Hargraves seems to have thought only of a rapid means of preparing the weft, but Arkwright saw clearly that if any method could be found by which cotton could be spun into threads strong enough to act as warp, the use of the linen yarn would be immediately superseded, and calicos might be made at a very reduced price. Long and anxiously he thought over the means of effecting his purpose, until at length when he was one day watching some workmen who were busy in elongating a red-hot bar of iron by means of rollers, the idea suddenly seized him of how his plan could be successfully accomplished. Unfortunately he was no mechanic. He had got his idea clearly in his own head; how was he to work it out? Happily his business had been so successful that he was enabled to procure the assistance of a man named Kay, a clockmaker at Warrington, and the two together constructed a machine, in which by means of a double set of

rollers, one moving three times as quickly as the other, the cotton was spun rapidly into a firm thin thread, quite as strong as the linen yarn which was then in use. I will ask papa this evening to show you a picture of the machine; he will explain to you exactly how it acts, and you will understand it better then than I can tell you now."

"Oh, we must get Uncle Henry to take us to Manchester!" said Charles. "I suppose that is where all these machines are seen to perfection. I quite like learning when it takes the form of jolly excursions all over the country."

"I dare say you do," replied Mrs. Grenville with a smile; "but I am afraid you would find a visit to Manchester a very different thing to our pleasant little trip into Cornwall; there is something to me dreadfully depressing in the smoke, and dirt, and misery of the manufacturing districts. The people all look so careworn; the very children are like old men and women. There is such perpetual noise, and din, and hurry; there seems no time for rest, or for enjoying this earth which God has made so beautiful. You would see no such cottages as those we were in in Cornwall, and you would hear no such merry shouts of children's laughter; there is no time to play with Skye terriers there. You must wait

till you are a little older, and then I will ask papa to take you to Manchester."

"Well then, Aunt Helen, I must try and be patient, and you must go on with Arkwright's story."

"Highly philosophical," said Mrs. Grenville; and then she added, "As soon as Arkwright felt sure that his machine would answer the purpose for which it was intended, he determined to remove from Preston and take up his abode at Nottingham, as he naturally thought that the men who had ruined Hargraves and destroyed his spinning-jennies would not be at all likely to give a more favourable reception to this new machine. Arrived at Nottingham, he, like Hargraves, had many difficulties to contend with, his own little capital being quickly exhausted; fortunately, however, he obtained an introduction to a Mr. Strutt, a stocking manufacturer, a clever, able man, who having a great taste for mechanics, was quite able to appreciate the value of Arkwright's new machine, although at the same time he pointed out many little improvements that might be made in it. Arkwright immediately admitted the truth of what he said, and candidly confessed that he himself had been quite aware of the defects of the spinning-frame, but that in spite of his utmost efforts he had been unable to rectify them. Charmed with his candour, and struck

with the great native power and energy of the man, Mr. Strutt willingly listened to Arkwright's suggestion that they should enter into partnership and establish a mill between them. Nothing could be more satisfactory, Strutt being an educated man and a skilful mechanist, could exactly supply the knowledge in which Arkwright was deficient; and under the able superintendence of the two friends, the erection of the new machinery went on successfully, and the first mill was opened in Nottingham, in 1769. Unfortunately there were none of Watt's engines in existence to supply the steam power, and the partners were obliged to employ horses to keep the machinery at work. This was found such an expensive operation that Arkwright advised that they should remove their works to Cromford, in Derbyshire, where they could make use of the river to obtain water power. This suggestion was acted upon, and in 1771 the manufactory was opened, which was destined to immortalize the name of its founder. Fame and fortune, however, did not visit Cromford of their own accord; for many years Arkwright found it a hard fight against the prejudices of the ignorant and the schemes of the designing, who hoped to rob him of the fruits of his talent and industry by infringing in every possible manner upon the patents with which he had sought to protect himself.

Fortunately, however, Arkwright had both the nerve and the money to carry him safely through all legal disputes. Meanwhile the fame of his invention was steadily advancing, and no more striking proof can be given of its complete success than the fact that in 1771, 4,764,589 lbs. of cotton were imported into England, whilst in 1800, so greatly had the demand for calico manufactures increased, that 56,000,000 lbs. did not supply the want. Now, indeed, when between three and four hundred millions of pounds of cotton are used every year, this sum seems as a mere nothing; but in those days when there were no steam-engines to work the mills, and when the Continent was closed to our manufacturers, the sudden impetus given to the cotton trade through the genius and enterprise of Arkwright, must have appeared something almost fabulous, and scarcely less wonderful must it have seemed to Arkwright himself to be thus transformed from an itinerant barber into the chief of one of the greatest establishments the world has ever seen.

"Happily for himself prosperity did not take from the truthfulness or vigour of his natural character; neither his great wealth nor the consideration with which he was treated by the most distinguished men of his day made him forget what he had been, nor relax in his

efforts to make himself worthy of what he had become; and so fully was he aware of the deficiencies of his early education, that he resolutely took two hours every night from the very short time which he allowed himself for sleep that he might master the intricacies of the English grammar, and teach himself to spell and write correctly. No wonder that a man who could exercise such self-denial, as to do this after working from five o'clock in the morning until nine o'clock at night, succeeded in all his enterprises; nor that when he died he left a fortune of half a million of money to his children. But whether any human being is justified in expending his whole energies in worldly pursuits, however laudable, is quite another question; not that I mean by saying this to blame Sir Richard Arkwright, I know far too little of his personal character to pass any judgment on him whatever, but in holding him out to you as a model worthy of imitation for his perseverance, his energy, his self-denial, his wonderful powers of endurance, which united to his good sense and clear judgment brought him successfully through trials and difficulties which would have overwhelmed an inferior man, I would not have you suppose that I would put all these qualities, and the worldly success which they of

necessity bring with them, for one moment in comparison with the working out of that which after all is the only thing of real importance, the obtaining an inheritance eternal and which fadeth not away. When we are young I know we are all more or less apt to be dazzled by the fame of those who have drawn upon themselves the world's applause, simply by the force of their own character and genius. But I have lived to see the end of these things. I have watched the last days of those whose lives have been devoted to the world, its pleasures, its pursuits, the gaining of its wealth and honours; and I have learned the full meaning of the words of one who had acquired all these rewards for himself and then confessed, 'These are the things that make death terrible.' I remember, however, too well, what I was when I was young, I have too vivid a recollection of my own eager longings for fame and for distinction, to hope that you will quite agree with me now. The grave has closed over those ambitious hopes for me, and now my only and most fervent prayer for you all, is that you may be good men, and faithful servants of your God."

There was a moment's pause; the children knew well of whom their mother was thinking, for young as they were when Harry died, they quite remembered his

noble, generous nature, and the fine talents which had been only too early developed. At length Arthur, looking up, said gently, "Mamma dear, I will try to remember what you have been saying; who knows but after all my ill health may be very good for me? If I was strong, I am afraid I should think of nothing but my inventions."

"You do not think of much else now," said Charles bluntly.

"Oh yes, I do," replied Arthur kindly, "you do not know how many thoughts pass through my mind, whilst I am lying all alone by myself on the sofa."

"I know they are always very kind ones," replied Charles, struck by his cousin's manner, and repenting in a moment of his own abruptness; "otherwise you never would be so good-natured to such an ungracious bear as I am. I am so sorry, Arthur."

"Oh, do not mind; what you said was very true, only I do think of a good many other things, besides my inventions."

"But, mamma," exclaimed Ernest, "I thought Arkwright invented a steam-engine; I have always been expecting you to come to it."

"Oh no, his time was fully occupied in preparing his spinning-frames, and, as I have told you, he made

use first of horse, and then of water power, to set them in motion."

"But would not steam have answered his purpose much better, mamma?"

"Undoubtedly; but then the engines such as he required had never been constructed. Arkwright opened his mill at Cromford in 1771, and it was not until two or three years after that time that Watt entered into partnership with Boulton. Arkwright died in 1792, therefore but little, comparatively speaking, could have been known of the wonderful facilities steam power was to offer to all the manufacturers of Great Britain. No sooner, however, were the engines at work, than a fresh want was felt: here were the goods indeed, but how were they to be transported rapidly from one part of the world to another. If some means could not be discovered of carrying these great bales of merchandise quickly and economically, warehouses would be overstocked, trade would be at a stand-still, and as a mere matter of profit manufacturers might as well have been without their engines as with them. But one discovery paves the way for another, and the remedy for this new evil was found by George Stephenson, when in the face of such difficulties as perhaps no one else has ever been called upon to overcome, he

planned and carried into execution the most gigantic undertaking the world has ever seen. I do not know a more interesting story than the life of this very remarkable man, or one which better illustrates the truth of my favourite theory, that energy of purpose, combined with good sense and perseverance, are far more valuable qualities, and will at all times secure greater success, than the most brilliant intellectual acquirements. It is hardly possible to conceive greater disadvantages, in a worldly point of view, than those under which George Stephenson worked his way to fame and fortune. A life of him has recently been published by Mr. Smiles, and a most charming, amusing book it is, and one which you will enjoy to read for yourselves when you are a little older; for the present, I think you must be content with my telling you such portions of the story, as I think will be of interest to you [1].

"[2] The father of George Stephenson was a workman in a colliery at Wylam, about eight miles from Newcastle, he was an honest, kind, industrious man, but

[1] For the accuracy of the facts stated in the following story, the writer is greatly indebted to Mr. Smiles' "Life of George Stephenson;" she has indicated in footnotes, at the commencement of each chapter, the portions of Mr. Smiles' book from which her information has been derived.

[2] See Smiles' "Life of Stephenson," pp. 1—26.

very poor; and as he had a family of six children, he had to work hard to support them. George, who was his second son, was born on the 9th of June, 1781; from his boyhood he was an independent, spirited little fellow, and ready and anxious to obtain information on all subjects. His education, however, was of a most desultory kind; his father was much too poor to be able to send him to school, so all George's learning consisted in listening eagerly to the stories his father used to tell him of an evening, about Sinbad the Sailor, and Robinson Crusoe, or heroes of the same description, whose adventures old Mr. Stephenson invented on the spur of the moment for the amusement of his children; all which stories, I dare say, excited George's childish ambition, and made him long for the day when he should be as great and as celebrated as they were.

"When he was about eight years of age, he was promoted to the dignity of taking charge of the cows of a poor woman, who lived at a farm not very far from Mr. Stephenson's cottage. George was delighted with his new occupation; not only did he receive twopence a week regularly, but he had plenty of time which he could devote to his favourite amusement of constructing model engines with the clay which

he found in a neighbouring bog; for hours and hours together he would sit watching his cows and working away at his clay models. It is very likely that even in those childish performances may have been seen germs of the wonderful improvements which he afterwards effected; at any rate, the knowledge which he thus acquired, of the different parts and construction of the engine, was of the greatest advantage to him, when at a later period it became his especial care and study. In a short time, however, George was pronounced too old to sit and watch cows. He was obliged to relinquish his favourite modelling and take work at the farm; this was all very well, but his heart was with his engines. He said he never should be happy till he got back amongst them again; at length to his great delight he was taken on regularly as a 'picker' in the colliery where his father was employed. His business now was to clear the coal from bits of stone or dross, or whatever impurities there might be, and, although this occupation was one of the lowest in the mine, and very far removed from the great object of his ambition, the entire charge and management of the engine, yet he could see and be near his favourite, even if he could not touch and handle her. At any rate he had placed his foot on the first ring of the ladder; it

should not be his fault if he did not soon mount to the top.

"At length the day arrived, so long, so anxiously expected. George was allowed to help his father in firing the engine; a happy, proud boy he was. There was but one drawback to his enjoyment; he was so much younger than those generally employed about the engines, that he dreaded that the master of the mine should object, and turn him off his works. No sooner, therefore, did he hear his step coming near than leaving his father to take care of the engine, he would scamper away and hide himself till the danger was past. If George had not been such a general favourite he might have got into trouble. But he was such a bright, high-spirited, good-natured boy; up to all sorts of fun and nonsense, ever ready with a cheery word and kind act, that he must have been a very bad-natured man who would have told tales of Geordie Stephenson; and so the boy worked on, and every day his love for his engine grew stronger and stronger.

"It did not, however, absorb all his thoughts, his nature was so kindly that there seemed room in his heart for every living creature, and endless were the pets he tamed. Now he would take home a whole number of birds, and domesticate them so entirely, they would

walk about the cottage as unconcernedly as if it was their own nest. One blackbird in particular was his especial pet. This bird would go away for months in the spring and summer, and then as soon as ever the frosts set in, and the weather became cold, back it would fly to its old friend, as if it was quite sure where it would receive a cordial welcome. Then he would have a family of rabbits, and knew them all individually. In fact it would be endless to go through a list of all his pets, for to the last day of his life every thing in nature had charms for George Stephenson.

"In such happy, rational pursuits two or three more years passed away. His mind becoming every year more acute and vigorous, as his bodily strength was gradually developed. At length, when he was about seventeen years of age, his character for steadiness and intelligence was so well established, that he was appointed engine-man, a very responsible office, and one only given to those who can be thoroughly trusted. George was naturally highly delighted at such confidence being placed in him; and determined to show that he was not unworthy of it, he made up his mind to devote all his leisure time to making himself thoroughly acquainted with the construction of the engine thus placed under his charge, and then if any part went

wrong he hoped that he himself should be able to rectify it without calling in the aid of the resident engineer, whose business it was to assist the engine-men in any difficulty beyond their powers.

"In order to understand what a very difficult task he now set himself you must remember that George Stephenson could neither read nor write, and therefore all that had been written and published on the subject of the steam-engine was so much sealed matter for him. He had to work his own way to a right understanding of the subject by the force of his own observation and judgment. Nothing daunted, however, he set himself to his task, and as soon as the day's work was over, he used to take his engine to pieces. He knew well that the only way to succeed is patiently to master each difficulty as it arises. So as soon as he clearly understood one portion of the works then he would pass on to another, until at length he acquired a thorough practical knowledge of even the most intricate machinery; a knowledge which was afterwards of inestimable value to him. But the better workman he became the more he felt how much there was yet for him to accomplish, and now for the first time he fully realized all the disadvantages of his early want of education. To feel the want, however, was with George

Stephenson to find the remedy; his time was fully occupied and his wages were very small, but still some portion of both must be devoted to the acquisition of that learning which could alone give him possession of the knowledge he so eagerly coveted. There was a poor man in the village of Walbottle, named Robert Cowens, who kept a small school, and was in the habit of teaching in the evening some of the elder boys, whose time through the day was employed in the mines. This class George joined, paying threepence a week for his instruction. It was but poor teaching at the best, but George brought such an eager willing spirit to his lessons, that he had soon mastered all the first difficulties both of reading and writing, and to his great delight was able to sign his own name.

"Most fortunately a Scotchman of the name of Andrew Robertson, a man of far higher attainments than Robert Cowens, happened to come about this time to settle at Newburn, a village not very far from the mine at which George was employed. Robertson opened a night school for young men. Many of the miners were glad to take advantage of this opportunity of 'becoming scholars,' but to no one was the boon greater than to George Stephenson, and he soon became the most distinguished pupil in Robertson's class. His great talent was

for arithmetic, and such rapid progress did he make that one of his young companions who joined the class at the same time as himself, was quite in despair at finding himself thus distanced in 'figuring,' as he called it, and sought in vain for the explanation of the mystery. He might have found it in George's wonderful perseverance; no difficulty disheartened him. If he could not do it one way he would try another; he would take his slate with him when he went to attend to his engine, and at every leisure moment down he would sit to his sum, and when after hours of labour still it would not work out right, never mind, he would rub it out and begin again. It was hard if he did not come out conqueror at last."

"That was the rule of practice with a vengeance," said Charles laughing.

"It was indeed," replied Mrs. Grenville; "such perseverance was sure to meet with its reward, and George began to hope that he should now soon attain the great object of his ambition, and be able to read for himself all the details of those wonderful engines of Messrs. Watt and Boulton, to the description of which he had so eagerly listened. He would have liked to have gone to Soho, if that had been possible, but that could not be, and very fortunate for him that it could not, for little as he thought of it then, he was to achieve a repu-

tation in the north surpassing even that of the man whom he so much admired.

"Having now made himself fully acquainted with all the different parts of his engine, Stephenson's next ambition was to become brakesman, a man whose duties are very much the same as those of engine-man on the locomotive at the present time. It was an office that required great skill and nicety, as the brakesman had to see at once to the working of the engine, and to the raising and lowering of the baskets, it was therefore a post of more importance and better paid than the one of engine-man, which Stephenson had now held for several years. The jealousy of some of his companions was at first an insuperable barrier to his obtaining the coveted employment. With the steady support and assistance, however, of one of his earliest friends and fellow-workmen, this difficulty was at length overcome, and to his great delight he was appointed brakesman to the Dolly Pit in the Black Callerton Colliery.

"But notwithstanding all his arduous duties, he always found time to attend to his live pets, they were his amusements, the other was his work; and such wonderful power did he exercise over all birds and animals, that he would tame the robin-redbreasts to come and eat bread crumbs off the engine, in spite of such fire,

and smoke, and din, and clatter, as you would have thought must have scared a respectable robin-red-breast out of his senses. But the most extraordinary stories of all are told of Spot, a very handsome brown long-haired shepherd's dog; this creature was endowed with the wonderful sagacity for which his race are so justly celebrated, and was so fond of his master, that he would do every thing that he bid him; at last the fancy seized Mr. Stephenson, of turning his favourite into a messenger, and making him bring him his dinner hot every day from his own home to the pit. After some preliminary experiments, the dog was sent home from the pit to the cottage; a tin, containing the dinner, was tied round his neck, and he was told to run off to his master as fast as possible. Off started the dog; he turned neither to the right hand nor to the left, nor did he stay to investigate what was the cause of the delicious odour coming up so fragrantly just under his nose; right on he trotted, straight through the whole village of Newburn, and safe and untouched he delivered his burden to his delighted master. From that day forward, Spot was employed regularly to fetch and carry, and a proud dog he was, as with head and tail erect he would trot along with a stately step, his tin canister suspended from his

neck. But, alas! all the dogs in the village were not animated by the same honest spirit as himself, and the smell of the passing dinner was so irresistibly attractive, that at length one day, a great bully of a dog who belonged to a butcher determined to intercept the messenger, and appropriate the contents of the tin to himself. Spot saw the approach of the enemy and instantly divined his intentions; he could not run away, he was of too brave a nature to contemplate such a cowardly proceeding, but he determined to die rather than relinquish his trust; he therefore calmly awaited the onset of the great beast, who was twice his own size and strength; a fierce conflict ensued, but the honesty and courage of Spot met with their due reward: the butcher's dog, beaten and disgraced, slunk off with his tail between his legs; and Spot, all torn and bleeding as he was, galloped off in triumph to his master, little dreaming that the tin he laid down so proudly at his feet, no longer contained the dinner for which he had so bravely fought and conquered. The contents of the canister had been spilt in the strife: a lesson that many an individual, and many a nation too, would do well to profit by. Astonished to see the mangled condition of his favourite, and to find his own dinner had wholly disappeared, Stephenson

Stephenson and his dog Spot.

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smell in a sponge-cake, to make it a temptation to Donald, and it would therefore be no credit to him if he brought it to them safely.

"Oh, indeed, Charles," said Mary, "Donald is so fond of sponge-cakes; I know he can smell them any where; I have seen him stand and watch, and wag his tail for ever such a long time, before the dining-room sideboard."

"That is because he knows cakes are kept there, not because he smells them," replied Charles.

"He will soon find there are cakes in the tin, trust Donald for that," said Ernest. "Let us make a beginning; you fetch the tin, Charles, and Arthur, you give me the cake, and we will try what we can do with him."

Now one of the accomplishments which Ernest had taught Donald, and of which he was unusually proud, was to place a piece of cake before the dog, and then make him sit and look at it, and not offer to touch it until the word of command was given. Accordingly this preliminary training was gone through whilst Charles went to fetch the tin; then, instead of being allowed to munch up the cake as usual, it was removed from his sight, placed in the tin, and then the tin was tied round his throat, and he was ordered to convey it from one

end of the lawn where Charles was placed, to the other at which Ernest was waiting to receive him.

But such a degree of obedience and self-denial was quite beyond the highest efforts of dog morality; not only was his accustomed reward taken from him, but the can which enclosed it was actually hung round his neck, encumbering his movements, and knocking painfully against his legs. It was too much to expect that he would patiently submit. In a series of miserable struggles he tried to free himself from his burden, and at length finding this utterly beyond his power, he sat down in the centre of the lawn, and yelled as only a Scotch terrier in an agony of annoyance can yell.

In spite of his manifest distress poor Donald looked so exquisitely ridiculous, that at first the children could do nothing but laugh, then, finding that neither coaxing nor threatening had any effect in making him obedient to their will, they grew angry and impatient, and it might have gone hard with their little favourite had not Mr. Grenville happened fortunately to come upon the lawn at the identical moment, and asking what they were about, and what was making poor Donald cry so piteously, he heard the story of George Stephenson's dog, and how they were intending to make Donald just as sagacious.

"I am afraid you are not taking the same way to teach him then," replied Mr. Grenville. "If George Stephenson had been as irritable with his dog as you are just now with Donald, I doubt very much if he would ever have brought him his dinner at all."

"But, uncle! he must be made to obey," interposed Charles.

"Yes, but not by being angry with him. If once you frighten him you will never get him to do what you wish at all. It requires the most extraordinary patience and perseverance to train an animal. You must imitate these qualities of Mr. Stephenson if you wish to obtain the same success. Here, Donny, come here," added Mr. Grenville kindly. Donald crouched up to his feet, and Mr. Grenville unloosed the tin, whose battered sides bore evidence of the violence of the struggle.

"Poor dog," said Mr. Grenville. "If he is as much hurt as the can he must be considerably bruised. Poor Donny, poor Donny," he added, as he patted him gently, "see, he is all in a tremble."

"Oh! he is a stupid little fellow," exclaimed Charles crossly.

"I rather think it is somebody else who is a stupid little fellow," replied his uncle, "to be angry because a dog does not immediately understand his meaning.

You seem to expect more obedience from an irrational brute than you yourself are often prepared to give. How came this tin here?"

"I brought it, uncle, it is all my fault," said Charles, "I never thought it would get spoiled."

"Well," replied his uncle; "if you will promise me patiently and good-naturedly to teach Donald to wear it, I will make you a present of it. Let him forget his present fright, and then teach him very gradually. It will cost you much trouble, and you will have need of considerable patience, but he will learn in time; and if you thus acquire a habit of perseverance, you will have learned a valuable lesson from the story of George Stephenson and his dog."

STEPHENSON'S COTTAGE AT WILLINGTON QUAY.

CHAPTER V.

Stephenson; anecdotes of his early struggles for independence; and of his untiring energy and perseverance [1].

"MAMMA, do tell us some more about George Stephenson," said Ernest, as the children were the next day sitting with Mrs. Grenville. "I want to hear some more stories."

[1] See Smiles' "Life of Stephenson," pp. 27—46.

"But you make such a strange application of them," replied Mrs. Grenville. "Papa tells me you frightened poor Donald most unmercifully yesterday."

"But we did not mean to do so, mamma."

"And besides, aunt," added Charles, "we are going to make it all right again. We gave Donald a double quantity of cake at tea last night, and I think he has forgotten all his troubles."

"Oh, that he has not," said Ernest; "he cut away like mad this morning, when he thought you were going to tie the tin round his neck again."

Charles coloured. "Is it not a bore, aunt," he said, "that the stupid little fellow is so frightened? I did not mean to hurt him, I am sure; and this morning I was ever so gentle, but he would not let me come near him with the tin; and I do not know what to do. I promised Uncle Henry I would persevere till I had taught him to carry it all right, and if he will not let me catch him, how can I persevere, aunt? It is not my fault."

"You must have patience, my love, until he has forgotten his fright; you will only make matters worse by persisting in your experiments. I should advise you to put something nice in the tin, and feed him out of it, and then let him have the tin to play with it. He will get used to it in that way."

"But I am afraid, aunt, if we did that," said Charles, "we should never get him to carry the tin safely; he would always be wanting to get the something nice for himself to eat."

"I do not think he would, if you gave him a reward every time he brought the tin safely. But I really do not know what else to suggest."

"I wish I could ask Mr. Stephenson," exclaimed Charles; "I wonder how he tamed his dog."

"By kindness and patience, you may be quite sure of that," replied Mrs. Grenville.

"Oh, please do go on telling us about him," said Arthur; "I do so want to know how he got on with his learning."

"Wonderfully, considering the great difficulties with which he had to contend," replied Mrs. Grenville; "but then he never wasted a moment's time; when others were drinking and idling, George Stephenson was hard at work, the only amusements which he allowed himself being to take a good long walk in the country with some favourite companion, or to go on a bird's-nesting excursion, in search of some new object of interest. His quiet, studious tastes of course exposed him to the ridicule of his more uproarious companions, and it was perhaps fortunate, that the misconduct of one of these

men afforded Stephenson an opportunity of showing that peaceful regular habits are quite compatible with a strong arm and a brave heart.

"At the mine where Stephenson was brakesman, there worked a man of the name of Nelson, a strong, powerful, vigorous fellow, but of such a violent temper that he was the terror of the whole neighbourhood, and by sheer dint of bullying, he carried every thing before him, and lorded it just as he pleased over all his more timid companions. Very likely Nelson was jealous of Stephenson, for most men of this class hate superiority in another, which they feel though they refuse to imitate; relying on Stephenson being as much afraid of him as every one else, he one day took occasion to swear at him most savagely for the awkward manner in which he said Stephenson did his work. To this language Stephenson, who knew quite as well what he was about as Nelson, would not for a moment submit, and so he quietly told the bully. Nelson only reiterated his charge, and following it up by very insulting words, he ended by challenging his opponent to settle their differences in a fair and open stand-up fight. To the surprise of all the lookers on, Stephenson instantly accepted the challenge, and fixing a day when he should be quite prepared to meet his

adversary, he returned with the most perfect composure to the care of his engine. The news that Geordie Stephenson was going to fight Nelson spread like wild-fire through the neighbourhood, causing the most unbounded excitement, and though people were afraid openly to express their ardent hopes, that Nelson might get just such a thrashing as he deserved, yet their silent sympathy was not the less sincere. There were some few, however, who, thinking the contest too unequal, and dreading even that it might end in Stephenson's death, would have dissuaded him from fighting at what seemed to them such dreadful odds; but to all their well-meant expostulations he had but one reply, 'Never fear for me, I will fight him.' And fight him he did, and beat him too; and from that day forth he would have been a bold man, who would have ventured to find fault unjustly with George Stephenson, or to call in question either his spirit or his courage."

"Why, mamma," exclaimed Ernest, "I thought you did not approve of fighting."

"Fighting for fighting's sake is what I dislike," replied Mrs. Grenville; "that seems to me both cowardly and brutal; but fighting in support of some great principle, or to protect the weak and helpless, is often not only justifiable, but positively necessary.

I agree with our friend Tom Brown[1]: 'As to fighting, keep out of it by all means if you can. When the time comes, if it ever should, that you have to say "Yes," or "No," to a challenge to fight, say "No," if you can, only take care to make it clear to yourself why you say "No." It is a proof of the highest courage, if done from Christian motives; but do not say "No," because you fear a licking, and pretend it is because you fear God; that is neither Christian nor honest. But when you must fight, fight it out, and do not give in whilst you can see and stand.' A passage I was so struck with, that I know it by heart. Once be quite clear what are the motives which actuate your conduct; be sure that they are noble and right ones, and such as God would approve, and then fight as much as you like. Stephenson's victory was of the greatest use, not only to him but to the whole neighbourhood, and his character for bravery once established, he had but little difficulty in following his own inclinations. He had now a double motive for wishing to lead a quiet, steady life, as he had become extremely attached to a very sweet, pretty girl, named Fanny Henderson. Anxious to be married as soon as possible, and yet wishing to save a small sum first to

[1] See "Tom Brown's School Days," by an Old Boy.

buy the furniture necessary for commencing housekeeping, it occurred to him he might employ his spare time profitably by turning shoemaker, and he set to work with such a hearty good will to learn this new trade, that in a very short time he was the most popular cobbler in the whole neighbourhood; and his earnings soon reaching the sum he thought necessary to justify his taking a cottage, there was nothing to delay his marriage, and on the 28th of November, 1802, it accordingly took place; and he and his wife settled down in their new home at Willington, and a happy home it was.

"Mrs. Stephenson seems to have been a sweet, bright, cheerful woman, just the very person to gladden up a poor man's home, when he returned to it tired out with his day's work; and I question whether amidst all the luxurious splendour of his later life, George Stephenson did not look back on that first year of his married life, when he used to return home, and work out his problems by his humble, but bright and cheery fireside, as to one of the happiest portions of his whole career. It was well he made the most of it; it was destined to be but a shortlived happiness, for soon after the birth of their little boy, Mrs. Stephenson's health gave way. It was thought that it might be only a temporary in-

disposition, from which she would gradually rally; but, alas! the seeds of disease had taken root. The progress of the ill might be delayed, but could not be averted. For two years George Stephenson hoped against hope, and then to his inexpressible grief, the birth of a little daughter cost Mrs. Stephenson her life. The child lived only a few months, and then was laid by its mother's side in her early grave. But Fanny was not forgotten; the memory of her sweetness, her gentleness, her beauty, never faded from her husband's mind. Neither the lapse of years, nor the whirl of business, nor the incessant claims which the world and society made upon his time, ever dimmed his recollections of his first love. She held her own place in his heart, as warmly and as vividly, as when in the days of his early struggles she was his joy, his support, his comforter. He loved to trace all that was good in himself, and his boy, to her gentle influence; and years and years after, when Robert had attained to fame and fortune, his father would look at him proudly, and exclaim, 'He owes it all to his mother.'

"It was natural that with this exceeding love for his wife, Mr. Stephenson should after her death cling, more fondly than ever, to the child who remained to him. Robert, his darling boy, became his father's in-

separable companion; and to procure for his son, when he should be old enough to profit by them, those advantages of education, the want of which he felt so acutely himself, was the one absorbing subject of George Stephenson's thoughts and anxieties. But how was it to be done? how was he, a simple brakesman, to save such a sum of money as would suffice for his purpose? It was hard matter enough to live, let alone education. But difficulties never disheartened George Stephenson; on the contrary, the more insuperable they appeared, the more they excited his determination to conquer them. He would deny himself in all but the bare necessaries of life, and Robert should obtain what he valued above meat and drink. But deny himself as he would, his savings increased but slowly. This was the time of the great continental war; provisions were extraordinarily dear; and the distress caused by heavy taxation was pressing cruelly on the lower orders. Chance opened a new source of wealth to the ingenious mechanic.

"One day when George was busily at work at the mine, the chimney of his cottage caught fire; the neighbours ran to put it out, deluging in their zeal the chimney with water, which of course made its way into the cottage below, covering every thing with soot,

and spoiling all that could be ruined by dampness. Amongst the articles that suffered was a clock, the most precious of all his household stores. It was a terrible blow to Stephenson, to come home and find his poor friend silenced, whilst its hands pointed motionless to the time of its decease. What was to be done? if his clock was sent to a clockmaker to be repaired, he must of course be paid for his work, and that was so much taken from Robert's schooling. Why should he not put it to rights himself? true enough, he had never done any thing of the sort, but there must have been a time when the most expert clockmaker who ever lived had been in the same predicament; why should he not do what another man had already done? he could make an engine go, why could he not make a clock go likewise? Accordingly the clock was taken down, and its works most carefully studied, until the principle of its mechanism was thoroughly understood. Then commenced the work of reparation, costing him many hours of patient thought, until at length he had the delight of seeing his friend once more established in his old niche, and ticking out his gratitude with a loud and regular beat. The story of this new achievement was soon spread abroad, and petitions poured in from the owners of all

the invalid clocks in the neighbourhood, that they also might be put to rights; until at length George Stephenson's fame as a clock-mender must have caused a panic amongst the regular members of the profession, while it added materially to the weekly savings of the self-taught artist.

"It is an old saying, but a very true one, 'That we none of us know what we can do till we try.' It is because we will not give our minds to our occupations, and set about them with downright earnestness, as George Stephenson did, that we fall so far short of the success which he obtained. Not but that he was a very remarkable man, for the qualities of his heart were quite as good as those of his head; and fond as I am of intellectual power, I must confess that this is not always the case.

"Not very long after his wife's death Stephenson received an offer from a Scotch firm who had large works near Montrose, that he should take employment under them and superintend the working of one of those engines of Boulton and Watt, which had for so long been the object of his admiration. Stephenson had nothing now to tie him down to his own old home, and the remuneration offered to him at Montrose was so much higher than that which he received as brakesman at Killingworth, that he

determined at once to close with the offer, thinking that he should now have the opportunity of saving a considerable sum of money, which could all be laid by for Robert's education. Full of this one idea, Stephenson made all his arrangements as quickly as possible, placed his boy with a friend on whose care he hoped he might fully rely, and then bidding his darling good bye, he started on his solitary journey with a brave spirit, though somewhat heavy heart.

"Arrived at Montrose, he entered immediately on his new duties, and made his arrangements for living as economically as possible, spending every hour in work that was not actually needed for rest and for refreshment. Unfortunately before Stephenson had been very long in his new situation, his active spirit conceived a notion that he could make some improvement in the engine of which he had the charge. He might have been right enough, but his scientific knowledge could hardly at that time have been equal to that of so experienced an engineer as James Watt, consequently his experiment failed. His employers were dissatisfied, and Stephenson was told that his services were no longer required. This must have been a sad blow just at the very moment when he was laying up a sufficiency for his darling purpose. However, it could not be helped,

he must make the best of it, and seek employment elsewhere. He might, very likely, easily have obtained what he sought in Scotland, but he was longing to see Robert again; his own people understood him best he felt, and if he was to attain to celebrity, it must be amongst those with whom already he had obtained a certain prestige. So with the twenty-eight pounds which he had saved, he made up his mind to go back again to Newcastle, and there to seek occupation amongst old friends.

"A curious story is told of his journey back again. Not wishing to encroach upon the sum he had put away for Robert, he travelled on foot, contenting himself with the plainest possible fare, and drinking only a good draught of water from some of the bright sparkling streams he passed by the way. Evening was drawing on, he had had a more than usually fatiguing day's march, when, tired and hungry, he was crossing a moorland, where he saw not a sign of a habitation; suddenly a bright light glimmered from a distance; there then perhaps was some cottage where he could find shelter for the night; he made towards the light immediately, and found to his great joy that it proceeded from the window of a farm-house. Stephenson knocked at the door, it was opened by the farmer himself; and

Stephenson made known his wants, and begged for a night's shelter. But those were perilous times; the country was unsettled, and robbers were very frequent visitors to lonely and unprotected houses. No wonder then that the farmer refused admission to a perfect stranger, who, tired and worn out with his day's march, and in his common working dress, very probably looked to the good man of the house a somewhat suspicious character. Nothing daunted by his refusal, Stephenson begged that if he would not admit him indoors he would kindly let him have a little clean straw in an outhouse. 'He wanted nothing,' he said, 'but a night's rest, and surely the farmer would not refuse that to a poor houseless traveller.' The sound of Stephenson's cheery voice attracted the attention of the farmer's wife; so out she came from the kitchen to see what all the talking was about, and what the stranger wanted with her husband.

"Women are generally gifted with a quicker power of perception than men; their judgment may not be so good in the long run, but certainly every now and then they jump to the best conclusions. No sooner did the good dame set eyes upon Stephenson than she read in his open countenance a guarantee for his honesty, and drawing her husband aside, she

so worked upon his feelings that he not only gave Stephenson permission to come inside the house and rest himself, but offered him cordially a share of their evening meal. The good people must have wondered who they had got with them; for Stephenson, grateful for their kindness, exerted himself to be as agreeable as possible, and told story after story, and anecdote after anecdote, till it was far on in the night before they any of them thought of going to bed; and the next morning when Stephenson, after thanking them for their hospitality, begged to be allowed to make a proper remuneration, his host and hostess angrily scouted such a notion. 'His stories were worth more than the bread and cheese which he had eaten,' they said, 'or the ale which he had drank.' They only asked one thing of him, 'that he would never pass that way without coming to see them.' Little any of the party thought how the promise Stephenson then gave them would be afterwards redeemed.

"Years passed away, and very possibly the good farmer and his wife, even if they remembered the very entertaining visitor chance had thrown in their way, had quite given up any idea of ever seeing him again, when one day a travelling carriage, perfect in its appointments, drew up before their door. The farmer and his wife

had grown old then, but I dare say they made the best haste they could to receive with all due honour such an unexpected guest. Quick as the woman had once been to find out Stephenson's worth, she must have been quicker still if in the well-dressed, striking-looking man, who now came forward cordially to greet her, she recognized at once the wayworn traveller who had years ago claimed and received her hospitality; all England was ringing now with his deeds, and many of the first houses in the land were eager to open their doors to admit the man, who by his genius had produced a complete change in the social condition of the world, and given to England a new era of commercial greatness. But Stephenson, simple in prosperity as he had been patient in adversity, did not forget the humble friends who had so generously received and entertained him in his hour of want. Now was his turn to show kindness and generosity, and he was only too glad to have the opportunity of returning it tenfold.

"It is curious to find how much stranger things happen in real life, than any which a novelist would dare to introduce into his stories; it is this which makes me think biography so much the most interesting of all studies, and it has the additional advantage that being perfectly true, the stories we hear

are an encouragement to ourselves 'to go and do likewise.'"

"Well then, Aunt Helen," said Charles, laughing, "suppose I invite in the very next man who comes to the door to beg, do you give me leave?"

"Certainly, if you are sure it is a George Stephenson to whom you are giving the invitation. But remember he did not come to beg, and remember also, Charles, that if you merely listen to what is good, or noble, or generous, for the sake of turning it into fun, and think you show your wit or your wisdom by overlooking the real point of a story, and fixing on some secondary and absurd deduction, your wit will be of very little use to you, and your wisdom will hardly earn for you the applause of the only class of persons whose approbation is worth having."

It was seldom Mrs. Grenville spoke so severely, and Charles blushed crimson at his aunt's rebuke. "I did not mean to say what was wrong, Aunt Helen," he added.

"I dare say you did not," replied Mrs. Grenville, "you only meant to say what you considered funny, and that is too much not only your tendency, but the tendency of the present day. No matter how good, or how amiable, or how high-toned an action may be, it is

sacrificed without remorse to the love of a joke. I cannot bear the spirit that this thirst for the ridiculous engenders; once admit it as your principle of action, and it eats at the root of every thing that is good and noble, until at last the very power of appreciating what is excellent or beautiful is blunted, if not wholly lost."

"Oh, aunt! I never thought of such a result as that," exclaimed Charles, "I should be very sorry if I ever became so bad as that."

"I am sure you would, my dear boy, and therefore I want to warn you in time, for this love of turning every thing into ridicule grows rapidly and imperceptibly upon a person; and though I should be the last to desire to put any undue restraint upon your naturally high spirits, yet you must be upon your guard not to let your love of what is droll make you unmindful that there are far higher qualities than drollery, and many occasions when to give way to our ludicrous impressions, is not only in bad taste, but positively wrong. However, I do not wish to say any more about it now, we will return to the far pleasanter subject of George Stephenson and his adventures.

"On his arrival at home, he found sad news awaiting him: his poor father had met with a most dreadful accident; whilst he was employed in attending to his

engine, a fellow-workman had accidentally turned some steam on to his face. The accident was done in a moment, but the mischief was irreparable; the poor man became perfectly blind. It was doubly sad for him; he was getting old; he had nothing to depend upon for his subsistence but his labour; his sons could only just manage to keep themselves; what was to become of him? Matters grew daily worse, and when George returned home, it was to find his poor old father blind and helpless, and overwhelmed with debt. It was a terrible blow; what was to be done? there were his earnings certainly, Robert's school money, that money for which he had risen early, and worked late, and denied himself almost the bare necessaries of life. Must that be given up? The question was soon decided; Robert was young, he could afford to wait a while longer for his schooling. His father was old; if he let slip this opportunity of helping him, how did he know that another would ever be granted? He would do his present duty, and trust that a way would be opened at some future time for providing for the education of his son. To decide, was to act. George Stephenson paid his father's debts, and then removed him to a neat, pretty little cottage, where he supported him for the remainder of his life. The sacrifice must

have seemed great at the time, but it was not made in vain; and God, who even in this life rarely allows a good action to go unrewarded, gave him other means of providing for his son, whilst the noble example he had set him of generosity and self-denial, was of more value than the most costly education money could have procured.

"For the moment, however, matters looked gloomy enough; Stephenson's earnings were all gone, and he had to return to his old occupation as brakesman; this was very disheartening, and nothing but the sustaining consciousness that he was doing his duty, could have upheld him during the perplexities and difficulties which now hemmed in his path. Indeed, so insuperable did they at one time appear, that he thought seriously of giving up his present situation and emigrating to America, to try his fortune in a new world; fortunately for himself, and for England, he was diverted from his purpose. Brighter days were in store, though at present there was only a faint glimpse of the coming light; meanwhile he returned to his old trade of clock-mending, spending all his leisure hours in this manner, or in mending shoes, or in tailoring; in which latter trade he attained to such celebrity, that Stephenson's cut became as well known in the New-

castle mines, as D'Orsay's in the ring of Hyde Park. However, a new and more profitable occupation than any of these was about to be opened to him, and one in every way fitted to develope the fine powers of his mind.

"In a new pit which had been formed not very far from the one in which Stephenson worked, an engine had been erected for the purpose of pumping out the water. At the time that it was being built, Stephenson had gone to look at it, and he said directly it was faulty in its principle, and that if much water collected in the mine, it would be utterly unable to do its work. The men only laughed at the presumption of a common brakesman venturing to find fault with the operations of a practical engineer. They laugh safest, who laugh last. Stephenson took no notice. The engine was finished, and the day of trial came; in vain the pumps were set in action, they failed entirely to clear the mine. This was all very provoking, but of course it could soon be rectified. The ingenuity of all the engineers in the neighbourhood was taxed to find the remedy; but still the engine was obstinate, and still the mine was full of water. Occasionally Stephenson would walk over to the pit, and ask quietly, 'Well, how does she go on?'

"The men were obliged to admit, 'badly enough;' but no one thought of applying to Stephenson for his assistance. At length, when a whole year had been wasted in fruitless endeavours to get the engines to work, it chanced that one afternoon Stephenson paid a visit to the pit, and found the men more than usually put out with their refractory engine. Determined to satisfy himself as to whether he was right or wrong in his suppositions, Stephenson made a careful and thorough examination of it, in all its parts.

"'Well,' said one of the men, half jestingly, when he had finished, 'What can you make out of it?'

"'That if this engine was in my care,' replied Stephenson, 'I would have the mine dry enough for you all to be at the bottom in a week.'

"This bold assertion was repeated to the overseer of the mine. That Stephenson could succeed, and in so short a space of time, where all the best engineers in the neighbourhood had failed, seemed certainly improbable enough; however, as physicians could not cure the disease, better quacks they thought should have their turn, so Mr. Dods went to find Stephenson, and ask him whether it was true he had made such a daring boast. 'Only give me leave to do precisely what I like,' replied Stephenson, 'and to choose my own men to

work under me, and I engage that in a week's time your engine shall be in thoroughgoing order; only remember, I must not be interfered with, and I must be allowed the entire control over my gang of workmen.'

"Dods was too much disheartened with all the trouble and expense the unfortunate engine had already occasioned, to be very particular about the terms on which it could be set to rights, and besides, he very likely felt that just such determination as Stephenson now displayed, was precisely what was wanted to bring the undertaking to a successful issue; so giving him *carte blanche* to do what he pleased, he bid him set to work without the loss of a minute's time. Stephenson said he must have a few hours to make up his mind as to the exact course he should adopt, but that on the following morning he and his workmen would be at the pit's mouth. Punctual to a moment he kept his appointment. Under his superintendence, the engine was entirely taken to pieces; four days were employed in making the necessary alterations, and in putting the engine together again; on the morning of the fifth day, the pumps were put in action, and before four-and-twenty hours had elapsed, the mine was cleared out, the workmen were walking about on dry ground at

the bottom, and the success of the indefatigable brakesman was thus made abundantly clear. Mr. Dods was so delighted, that he made Stephenson a present on the spot of ten pounds; a sum which in after years must have seemed to him ridiculously small, but which now, coming all at once, appeared like a little fortune.

"And I dare say he kept it all for Robert," exclaimed Arthur.

"I dare say he did; at least I am sure he did not spend any on his own amusements," replied Mrs. Grenville; "for so rigidly did he adhere to the strict rules of conduct which he had laid down for himself, that when a short time afterwards Mr. Dods, who had taken a great liking to him, invited him one morning to come and take a glass of ale with him, Stephenson respectfully, but firmly, declined, saying he had quite made up his mind to allow himself no indulgences of the kind, lest he might be tempted to encroach upon his hours for studies, or on the little fund which he had appropriated for such much better and higher purposes."

"What a grand fellow he was!" said Ernest. "He deserved to succeed."

"To deserve success is generally to secure it; for as a rule, God has mercifully ordained that the careful

cultivation of the higher moral and intellectual qualities shall tend to promote both our prosperity and our happiness; deeply grateful we ought to be to Him, that He has thus ordained it. But now that we have brought our hero to a safe landing-point, we must leave him for the present to the full enjoyment of his victory. I promised to walk down to the school, to look over some new books with Miss Jones."

"May I go with you, mamma?" asked Arthur. "I want to see Willie Crampton."

"Yes, certainly, my love, if you like it. Run and get your cap; I shall be ready almost as soon as you are."

Mrs. Grenville had always accustomed her children to accompany her in such of her visits to the poor people, as they could safely pay, rightly judging that the only way in which they could learn to sympathize with wants and sufferings, from which they were so completely removed, was to see for themselves what others were called upon to endure; and thus learn to thank God for the happy lot, which in his mercy He had seen proper to bestow upon them.

To Ernest and Charles these visits were sometimes great bores, they would rather have been riding, or fishing, or playing at cricket. Gradually, however, as

they began to feel the pleasure of doing good, they learned to take more and more interest in the well-being of others, and Mrs. Grenville hoped that, in course of time, and if they were not injudiciously urged on, they would learn how much of our truest happiness arises from ministering to that of others.

With Arthur the case was different. His delicate health prevented his entering freely into the manly sports of the other boys, and his peculiarly sensitive and refined nature found a positive delight in sympathizing with either the joys or sorrows of others. To see the countenance of some poor little invalid brighten up, as he offered flowers from the conservatory, or a bunch of grapes, or two or three fine ripe peaches, was to Arthur a positive delight; and he never would have tired of reading his favourite stories to a group of eager little listeners, or of imparting to those who liked to learn, the knowledge of which he was himself so fond, and he would have sat for hours teaching a child to read, or trying to make it understand the rudiments of arithmetic. With Arthur, the difficulty was to prevent his doing too much, and Mrs. Grenville was obliged to lay down strict rules as to the times and seasons when his visits must alone be paid.

There was one family of whom Arthur was particularly fond: the father was a most respectable man, a labourer at the Grange; the mother, a hard-working, industrious woman, who did the very best she could to bring up her children as well as her somewhat scanty means would allow. Amongst her children was one, a remarkably clever boy. Willie, it must be confessed, had always been her darling, and had he not been of a remarkably sweet nature, he would have run a sad risk of being spoiled; but somehow he escaped, and a more delightful lad than Willie, when he was about twelve years of age, it would have been impossible to see. "And such a scholard too," as the mother said. "Willie could write like print, and read like a book."

But, alas! for our human hopes. Willie, the pride of his mother's heart, was overtaken by one of the most terrible misfortunes that can happen to a human being; owing to an accident thought nothing of at the time, and afterwards too long neglected, Willie, it was feared, would become quite blind.

Thanks to Mrs. Grenville's kindness, he had been able to obtain the best advice, but the oculist who saw him gave little hopes, the disease, he said, was on the nerve of the eye. It was possible, but hardly probable, that the poor lad would ever recover his sight. Great

was the sympathy felt for him throughout the whole village, for Willie was an universal favourite; but no one sympathized more heartily, or did more to alleviate the affliction of his poor friend, than Arthur; and whenever he could obtain his mother's permission, he was sure to be found at the cottage, reading or talking to the blind boy; and Willie counted on those visits, and his poor blind eyes brightened up at the sound of Arthur's footstep, and the light touch of his hand on the latch of the door.

"Master Arthur," said Willie, as Arthur, having left his mother at the school-house, had run on to the cottage, and was now sitting by Willie's side, "did you ever hear tell of a machine, by which the blind can write?"

"Yes, I have heard of them," said Arthur, "but I have never seen one."

"Do you think, Master Arthur, they are very dear?"

"I do not know," said Arthur, "I will inquire."

Willie said no more; but Arthur saw how his heart was set upon the possession of his machine, and as he walked back to the Grange with his mother, he asked her whether she could give him any idea what was the price of these writing-desks for the blind.

"I am not quite sure," replied his mother. "I will write to London and inquire."

As soon as Arthur got home, he went up stairs to his own room, and taking his purse out of his desk, he looked somewhat sorrowfully at its contents. By his mother's advice, he had always been in the habit of putting away some portion of his allowance, as soon as he received it, to be spent in any little act of private charity; and a very good plan he found it, because this being a separate fund, Arthur no longer considered it as belonging to himself, and spent it ungrudgingly. Unfortunately, his calls upon it had been rather large of late; nothing remained but a portion of his own private allowance, which he had wished to appropriate to the purchase of an expensive book on mechanics he had been long desirous of possessing, and to obtain which he had been for some time past saving every farthing that he could spare. The necessary sum was just completed, and Arthur had intended that very evening to speak to his father about it, and ask him to write to his bookseller and beg him to send it.

But the request had not been made, and so the money was still his own. Arthur looked wistfully at a little model which was standing on a table close by, and which he could not finish for want of the knowledge that very book

would convey; suddenly he turned away his head and exclaimed out loud, "What did George Stephenson do? and he was more tried than I am. He was a fine, brave fellow, and did his duty, and I will pray to God to enable me to do mine also. I can very easily go without my book for a little while longer, and Willie shall have his desk." And Arthur put back the money and went down stairs and joined in the sports that were going on, and no one guessed the sacrifice that had just been made; but God knew it, and accepted it as an offering made unto Himself; "And thy Father which seeth in secret," Arthur, "Himself shall reward thee openly."

MR. STEPHENSON'S COTTAGE AT KILLINGWORTH.

CHAPTER VI.

Stephenson promoted to the office of engineer of the High Pit—Anxiety for the education of his son—Robert's early life—The first locomotive—Improvements in the locomotive[1].

"Oh, aunt! Aunt Helen!" exclaimed Charles, as he one morning ran into the library where Mrs. Grenville was busily writing; "do you know, Donny has carried the tin, and carried it quite safely?"

"Has he? I am glad of that," replied Mrs. Grenville, looking up from her letter. "How have you managed it?"

"Why, aunt," replied Charles, colouring, "I have

[1] See Smiles' "Life of Stephenson," pp. 46—94.

not forgotten what you said to me, and I wanted to show you I was not quite such a fool as I seemed, and so I asked Arthur to help me; and I could have done nothing without Arthur, he is so gentle, and he knows so well what he is about; and he first coaxed Donny, and then we made him play with the tin; just as you advised us; and then Arthur put it very gently, very gently indeed, Aunt Helen, round his throat, and saw that it was all right and would not knock against his legs, and Donny did not much like it at first, but we patted him and told him he was a good dog, and we gave him some bits of cake, and we only let him have it on for a very little while; and at last, Aunt Helen, we have got him to carry it as well as possible, and he does not mind a bit. Do come and see."

Mrs. Grenville laid down her pen and followed her nephew out on to the lawn, where she found Arthur, and Mr. Grenville, and Ernest, awaiting her arrival for the exhibition of Donny's powers; and Arthur ran away to a great tree quite at the end of the garden, and then Charles tied the tin round Donny's neck and told him "to run off and take his dinner to his master," and off ran Donny, and he never stopped till he reached Arthur; whilst Charles stood looking on triumphantly at this successful issue to his teaching.

"I congratulate you, Charles," said his uncle, turning round and shaking hands with him, "not so much on Master Donald's performance as on the victory you have gained over yourself."

"Indeed, papa, Charles has been very persevering," said Ernest; "he has given up his rides and his cricket, and all sorts of things."

"Well, and he has got his reward. This may be only a very small matter," continued Mr. Grenville; "but if by teaching Donald he has learned the value of habits of patience, and perseverance, and determination to conquer difficulty, it has not been time thrown away. And believe me, Charles, many a man who has afterwards attained to fame and fortune, has looked back on his past career, and been able to trace his success in life to some circumstance quite as trivial as that of which we are now speaking, but which first taught him the value of those very qualities without which the most brilliant wit or genius will be, comparatively speaking, useless to their possessor."

"Oh, but, uncle," exclaimed Charles, "Arthur deserves your praise more than I do; I should have thrown it all up in despair but for him."

"Well, then, you must share your laurels," replied Mr. Grenville, "and now, if you like to celebrate your

victory by a good gallop over the downs, I am going to the sheep farm and will take you with me."

There was very little doubt about Charles's answer, and perhaps he never felt happier than when he rode by Mr. Grenville's side; conscious that by the exercise of real self-denial he had raised himself in his uncle's estimation. How many good resolutions he formed that he never would fall back into his old habits. Alas and alas! that it should be so very much easier to resolve than to practise.

"Now, Aunt Helen," said Charles, when a day or two afterwards the children were sitting with her, "you will not be afraid, will you, to tell us about George Stephenson? I do so want to know what became of him after he mended the engine."

"Mr. Dods naturally thought," replied Mrs. Grenville, "that no one was so likely to keep the engine in repair as the man who had wrought the cure; he therefore offered Stephenson the situation of engine-man of the High Pit, a post which, as it secured for him better wages than any which he had yet obtained, Stephenson was only too glad to accept. But this was not all; the fame of his exploit soon spread through the neighbourhood, and the owners of such engines as would not work applied to Stephenson to cure their laziness; the conse-

quence was that he had soon almost more business on his hands than he could manage in his spare hours, and business too which paid much better than shoe-mending or tailoring. Besides, his constant practice of taking to pieces and examining the different engines gave him the most valuable practical knowledge of their parts and method of acting, and stored his mind with new thoughts and ideas, which were at length to find their full development in the construction of the locomotive. Every moment which he could now give from his positive duties was devoted to building model engines, in which he was always inventing and working out some new improvement, and in this employment he received the most valuable assistance from his son."

"What, from little Robert!" exclaimed Ernest, "I thought he was quite a child?"

"So he was," replied Mrs. Grenville, "but he was a most extraordinary boy, and fortunately for him his father was not yet a rich man, for if Mr. Stephenson had then been wealthy, as he afterwards became, possibly his son might have been a different class of man. It required all the hardships and the difficulties with which Robert had to contend when young to bring to maturity those fine talents which have since not only placed him at the head of his profession, but

made him the companion of all the most celebrated men of the day. I remember his once complaining to me how different the young men were now to what they were some years ago; how almost impossible it was to find any one who was thoroughly hard-working and self-reliant; and I could not help thinking at the time that much of the fault was owing to the luxurious and self-indulgent habits of the present day, destructive as they are to all healthy vigour, whether of mind or body."

"Why, mamma," exclaimed Ernest, "do you know Mr. Robert Stephenson?"

"Yes, I have long known and honoured Mr. Stephenson," replied Mrs. Grenville, "and more than that, I always feel that I owe him a real debt of gratitude for having once reproved me very severely."

"Oh, mamma, you are in fun!"

"No, I am not, I am thoroughly in earnest. It was wise counsel that he gave me; and though I was young then, I felt the full truth of what he said to me, and have always since acknowledged that I have to thank Mr. Stephenson mainly for those habits of self-reliance and of perseverance which I have found so valuable to myself, and which I am so anxious that you should all acquire."

"Oh, I should so like to see him!" exclaimed Ernest.

"So should I," said Arthur, "he would tell me all about my engines."

"Yes, and it would be such fun," added Charles, "to see any one who had scolded Aunt Helen! I wonder whether he remembers it, aunt?"

"I am sure I do not know, it is a long while ago."

"Mamma, do you think he would come and stay here if papa asked him?" inquired Arthur.

"No, I should think not. He has no time now for paying visits to explain engines to little boys."

"But I am glad you know him, mamma," added Ernest; "it will all seem so much more true now, I shall like the story twice as well."

"Why, my dear boy, do you think I was inventing?"

"Oh, no, mamma! of course not; but it does make it all seem so much more life-like; and besides, now I shall think, perhaps I shall see Mr. Stephenson some day myself; who knows?"

"More impossible things have happened, certainly; but I must go back to the time when Robert was a child, much younger than any of you are now. From his earliest boyhood his father had made him his com-

panion, and Robert returned his affection with a love as entire as it was unselfish. There was no delight to him so great as to be able to help his father, and a very important service he was enabled at this time to render him. In pursuance of the plan he had formed, Mr. Stephenson sent Robert to school with the very first money he had to spare, and Robert made such use of his instruction that by the time he was seven or eight years old he had far outstepped his father's acquirements. He had always a decided taste for mathematics, and this taste was early strengthened and called into exercise. There was nothing that Mr. Stephenson liked better than to sit down quietly on his return home from his day's labour, and work out with Robert's assistance the different problems on which his mind might happen to be intent. It must have been a curious sight, that cottage home—its bright cheery fire—its miscellaneous furniture, every thing odd and singular that Stephenson could make or collect, and its walls covered with models of every size and description; and there surrounded by these evidences of his skill and ingenuity sat the father and the son, the calm, thoughtful, intelligent man, the eager, loving, earnest boy. How often in after years must they have looked back to those evenings, when hour after hour Robert would sit

happily by his father's side working out the problems, the full meaning of which he could not yet understand, but which he had a dim foreshadowing were to end in some great success, and when that end came I have sometimes wondered whether they did not look back to those winter evenings with something very like regret that they had passed away for ever. The world can give fame, and riches, but it cannot give such love and sympathy.

"But though Robert's chief delight was to improve as much as possible in his learning that he might help his father, yet his studies did not interfere one bit with his love of fun and play; he was a thorough boy, up to all sorts of mischief, and his scientific experiments became at length a terror to the neighbourhood. Amongst other books which fell into his hands was a life of Franklin. No sooner had he read the method by which Franklin drew lightning from the clouds than he was seized with an irresistible longing to do the same thing himself. But how was he to obtain the means of performing the experiment? He might indeed manufacture the kite, but its materials would cost money, and so would the wire, and the silk that he would require as a non-conductor. He did not like to ask his father for the money, fearing lest he should be

forbidden to try his perilous amusement. He looked earnestly at his little stock of wealth, a few pennies, and they were soon expended, and yet he had not bought half that he required for the manufacture of his apparatus. Fortunately for him his father's example had not been thrown away upon him; he had seen how patiently and steadily his father had held on his way, grappling with each new difficulty as it arose, and invariably the conqueror. So Robert took heart; occasionally he would earn a few pence, occasionally a few would be given him, and off he would run to the village shop to buy fresh materials to continue his favourite work. At length it was completed. Oh! how anxiously he watched the clouds for a fit day for his experiment, and then, unseen by any one, out he stole into the fields to try his experiment upon some neighbour's cows. Poor things, little they knew as they were quietly chewing the cud, the fate that was in store for them. Having fixed and prepared his apparatus, Robert let fly his kite. His success possibly surprised him as much as it did the cows; the electric shock was tremendous, and set the poor creatures scudding all over the fields with their tails on end, terrified half out of their senses. This was far too great fun not to be repeated, and complaints were soon brought to Mr.

Stephenson of his son's mischievous propensities, with a request that for the future his scientific experiments might be tried only on what belonged to himself. Robert was reproved, but I am afraid to little purpose, for he continued to practise his favourite occupation whenever the opportunity presented itself, and a great mercy it is he did not do any real mischief, or draw down the lightning upon himself, of which danger he certainly ran an awful risk."

"Then he did do naughty things occasionally," said Charles; "that is some comfort, I had felt quite oppressed with his goodness."

"He was like the rest of us, I suppose," replied Mrs. Grenville, smiling, "and fortunately for him his father, devotedly attached to him as he was, was never weakly or foolishly indulgent, and Robert was quite aware that if he did what was wrong a good sound whipping would be the inevitable consequence. So strict was Mr. Stephenson that he would not even allow of a lesson being idly and badly done. He knew perfectly well that the secret of all true success lies in the mind being wholly given to the occupation on which it is for the time employed. 'Whatever you do must be thoroughly done;' this was the maxim on which he himself acted, and he took care that Robert should do the same. Now

if there was one thing that Robert disliked when he was a boy, it was learning to draw. But Mr. Stephenson had made up his mind his boy was to be an engineer, and to attain to any eminence in this profession it was indispensably necessary that he should be a good draughtsman. Accordingly he placed Robert under the care of a Mr. Parker, the best master in that part of the country. Robert, however, profited little by his instructions, and no sooner was the master's back turned than Robert would be amusing himself with his calculations, or his modelling, or his scientific toys, or, in fact, with any of his numerous occupations which he liked better than his drawing. It so happened that when he was one day thus following his own devices, he saw the door open of the adjoining room where Mr. Parker was at work, and his father walk up to his master's easel.

"'Well,' said Mr. Stephenson, 'and how does my son come on?'

"'Your son?' replied Mr. Parker, 'he is the laziest dog I have ever had any thing to do with.'

"Robert started as he heard these words. 'Ah,' thought he, 'there is a flogging for me;' and sure enough it came before many more minutes had been allowed to pass.

"On the whole, however, Robert was a wonderfully good boy, and the steady progress he made in his studies was something quite surprising. Fortunately his father was now able to send him to a much better school; Mr. Stephenson's prospects were steadily brightening; he was appointed colliery engineer, a situation of great trust, and which brought him into constant communication with the owners of the mines, men of rank and education, who were fully able to understand and appreciate his vigorous and straightforward character, and who were afterwards of great use to him in enabling him to carry out his plans; more especially with regard to the locomotive, the construction of which engine was now beginning to occupy all his thoughts and spare time. Something of the sort had already been tried at a neighbouring colliery, and great wonder had the monstrous engine excited when it was first placed upon the rails, and set in motion, and extraordinary were its powers esteemed, when it dragged after it eight or nine loaded coal waggons, although it frequently took six hours to perform a journey of five miles.

"The execution of this engine and its powers of working were faulty in the extreme, but the idea was the thing; that once suggested, George Stephenson only asked for time, and he felt sure he could do the rest.

Ever since he had been appointed colliery engineer, he had been anxiously looking out for some method of easing the men's work, and procuring a rapid transit for the coals from the various mines to the ships that were to take them away. He had first thought of a self-acting incline, by which the weight of the loaded waggons in descending would draw up the empty waggons to the summit. This plan he contrived and executed, and it was found to answer perfectly. But no sooner did he see the engine which Mr. Blackett had constructed for running on an iron rail, than in a moment he knew his own scheme was surpassed, and that the real secret for which he had been so long searching was revealed to him in all its power. The only thing now was how to make use of it; however, he had conquered too many difficulties to be easily disheartened.

"His want of knowledge of what had already been written on the subject was certainly a great disadvantage to him; never mind, he must make the best of it; if he could not read for himself, Robert must read for him. So desiring his son to get all the books he could find on the subject, and carefully to master their contents, he himself devoted the whole powers of his mind to examining Blackett's engine as it now stood, finding out

its deficiencies, and how they might best be remedied. The more he studied, the more he was convinced that at length he held the clue to the most extraordinary discovery the world has ever received; and he confidently prophesied, that if once he could reduce his theory to practice, there was no limit to the speed which his engine might attain. Of course people laughed and called him an enthusiast and a visionary; but they had laughed before, and Stephenson had shown them their mirth had been premature; why should it not be so again? He was right; something within him told him he was right. Let who would oppose he should work steadily on, and the world would see great things before many more years had passed away. But there was one terrible impediment to success: money was wanting. It was clearly impossible for George Stephenson to supply the funds himself; and where was he to find any one willing to advance the requisite sum, for what the world pronounced an impracticable adventure?

"A meeting of the owners of the mine was called in 1813; Stephenson laid before them his plans for a 'travelling engine,' showing the immense advantages which would result from its use, and the incalculable saving it would effect in time, in expense, in labour.

Some of the committee were inclined to treat the idea as altogether visionary; but Lord Ravensworth, the principal partner in the concern, fortunately took a different view of the matter. He had had time to become acquainted with Stephenson; he had heard all his past career, and was not disposed to believe that a man who had so thoughtfully and perseveringly worked his way up to his present position simply by his own native power, and by his strong clear judgment, was now likely to be entirely deceived on a point which he had evidently thoroughly studied, and on which he spoke with such perfect confidence of ultimate success. If he failed, at any rate it should not be the fault of the proprietors of the mine. Stephenson might go to work whenever he liked; he, Lord Ravensworth, would be answerable for any expenses which he incurred.

"Backed by such an assurance, Stephenson applied himself with redoubled energy to his task; failure never disheartened him, he only learned how to avoid the rock of stumbling in future. But it was hard work; not only had he to invent and combine the different portions of his engine, but he had to teach workmen how to put them together. These works required such much more delicate tools and handling than any thing hitherto known in the north, that Stephenson found it

almost impossible to get the assistance he needed. However, what with doing it himself, and what with overlooking others, his engine was at last completed and placed upon the Killingworth railway on the 25th of July, 1814; and at the rate of four miles an hour it drew after it eight loaded waggons. It was successful, but it was not success, and Stephenson saw clearly that if his engine was to maintain its ground, some great improvement in its powers of working must rapidly be made. Hour after hour he anxiously thought over what could be done, carefully noting and examining its working in every part. One great objection that was taken to the engine, was the excessive noise which it made as it worked. Its horrible snorts and shrieks were something quite unearthly, frightening out of their senses all the cattle which came within hearing of the dreadful sounds. As Stephenson was thinking how this undeniable nuisance might be removed, it suddenly occurred to him that all this horrible noise might be made a means of doubling the speed of the engine. If the steam, instead of being ejected into the air with these infernal puffs, were conveyed into the chimney of the engine, and allowed to escape in a vertical direction, the blast would of course increase the fire in the boiler; steam would be more rapidly generated, and the power

of the engine would be increased at the same ratio. I wish I were a better engineer, to explain more clearly to you the working out of this simple and most admirable idea; I have no doubt Arthur understands all this a great deal better than I do; you must ask him to show you.

"The result of this new experiment could not, however, be known speedily. A new engine had to be constructed on entirely new principles, and months must elapse before it could be ascertained with certainty how it would work. At length all was finished, and the new engine placed upon the rails; as far as it went, it answered perfectly. Both in speed and in power it far surpassed its predecessor; but still Stephenson felt that there was much to be done before it would be generally adopted as a decided improvement on the old method of labour with men and horses. He felt greatly the want of skilled workmen to carry out his ideas. He was obliged to substitute all sorts of temporary expedients to supply the place of the delicate portions of the machinery, and then the rails on which his engine ran were not cast sufficiently strong to enable it to put forth all its power. They were perpetually breaking and getting out of order, and of course the expense of repairing them took so much from the profits of the working of the engine, that it became rather doubtful

whether the old method might not be the most economical after all. At least, such was the general impression, but Stephenson never for a moment admitted it.

"'These are only minor difficulties,' he said, 'we must expect them. What great undertaking was ever carried through without some drawbacks? trust me, that is all I ask; I see my way, success is certain in the end, give me time to persevere and to perfect.'

"Many shrugged their shoulders with a silent sneer. Others were wiser; they saw the stuff of which George Stephenson was made, and they waited patiently, never doubting that in time they would see the promised results. Day and night the subject was constantly in Stephenson's thoughts; he felt certain that he was right as far as he had gone, all he wanted now was to be able to carry out that which he had conceived; how to do this was the difficulty. Had he known all that had been already written on the subject, it would have saved him an infinity of labour and anxiety; for very often when he thought he had hit exactly upon the thing he wanted, he found, from the books which Robert would read, and the contents of which he would explain to his father, that the experiments had been tried already, and without success. But though a most unusual amount of labour was thus thrust upon him unnecessarily, it became in one sense of the greatest

value. Practice is at all times better than theory. The hard thinking by which Stephenson wrought out his problems for himself, and the constant habit of testing their truth by reducing them into shape, and seeing how they would work, gave him such a knowledge of his profession as no mere reading could ever have afforded. It convinced him that his sanguine hopes of success were founded on no mere theories, but on the surest and most scientific basis, and inspired him with such an entire reliance on himself, that opposition was, comparatively speaking, powerless to dishearten him. 'He and his boy,' he said, 'would show the world that they were right.' And they did it too. Robert was now growing to an age to be of the greatest service to his father; and Mr. Stephenson brought him up to be as practical a mechanic as he was himself. No shirking work was allowed; no cribbing, Master Charles, or jumping on to results, never mind by what means they are to be obtained. Step by step the young engineer learned his trade; and what he once learned, that he knew thoroughly for life. His father would place a drawing of the engine, or some of its parts, before the boy, and tell him to describe it all to him, just as if he were reading it out of a book; and so accurately could Robert perform this task, as to show there

were few portions even of the most complicated machinery that he did not understand as fully as a well-trained engineer.

"Oh dear me," said Charles, "I should not have liked Mr. Stephenson for a master."

"I do not think you would indeed," replied Mrs. Grenville; "you are such a sad lazy fellow, but, as I have told you, even Robert sometimes thought it rather hard to be so steadily kept to his work; however he soon learned to appreciate the value of the lesson his father taught him, and to feel, young as he was, that nothing great can ever be attained except by hard, steady, patient toil. There is no broad easy road to success; there is but one path for us all, and those who think it too stony and hard to walk in must be content to forego the reward at the end. It is the same with things earthly and things heavenly. There must be oneness of purpose; the only danger is that, as earthly things are present to our senses, we may allow them to absorb our time and thoughts to the exclusion of the things that are unseen; and then, alas! we bring down upon ourselves not a blessing, but a curse; and the coveted crown, for which we have toiled and struggled, fades and withers in our grasp. Our only safety is in sanctifying our daily work to God; let it be done to

his glory, and then we cannot work too hard. However much I should rejoice to see you all growing up earnest, intelligent, energetic men, I should rejoice in it far more because I should know that those qualities would make you the best servants of God, and most useful to your fellow-men, than because they are those which I am equally certain will most promote your own success in life." Mrs. Grenville paused for a moment, and then added, "But now I should like you all to go out and have a good run in the garden; the day is beginning to cloud over, and if you stay any longer with me it will get too cold for Arthur to be out. When we have another opportunity, I will tell you about a new discovery which Stephenson found time to make."

"Oh! what was it, mamma?"

"I cannot tell you now."

"Oh, mamma, but that is so tantalizing."

"Not at all, it will be something to look forward to. Run away."

Mrs. Grenville was inexorable, and the children were obliged to submit.

CHAPTER VII.

The Safety-lamp—Stephenson and Sir Humphrey Davy—Stephenson suggests the formation of a railroad between Darlington and Stockton—Is appointed engineer—Opening of the line [1].

"Now, mamma, you are at leisure to-day, are you not?" said Arthur; "and you promised to tell us about Mr. Stephenson's new discovery; I have been thinking of half a hundred things that it might be, and I want to know whether I am right."

"Did you think of a safety-lamp?"

"No, that I did not; but it was Sir Humphrey Davy who invented the safety-lamp, was it not, mamma?"

"He made the one most generally known, but George Stephenson had constructed one previously."

"Then what a shame," exclaimed Ernest, "that Sir Humphrey Davy should have all the credit!"

"So I think," replied Mrs. Grenville; "the fame ought to be more equally divided between the two, for

[1] See Smiles' "Life of Stephenson," pp. 94—208.

no doubt both equally deserve the praise that the partisans of Sir Humphrey desire to secure for him alone. However time, the great judge, has already begun to right the balances, and I have no doubt that future generations will hold the scales pretty equally between the rivals."

"But, Aunt Helen," said Charles, "what was the good of the safety-lamp? what was it wanted for?"

"To prevent the ignition of the gas," replied Mrs. Grenville; "you know what a quantity of gas all coal contains; well, when the seams of the coal are cut through, this gas rushes out into the collieries, and of course any workman coming along at the moment with a lighted taper is liable to set it on fire, and thus expose himself and his fellow-workmen to instantaneous death. Many a bad accident had taken place since Stephenson had worked at the mine, and often had he pondered over some means for finding a substitute for the tapers that were at that time used in the pits; incessant business, however, and his constant labour with his locomotive, had prevented his putting his ideas into any thing like form. At length one day, in the year 1814, a workman ran suddenly into his cottage exclaiming in breathless horror, 'Stephenson, Stephenson, make haste, make haste; the pit's a fire!' Throwing

his books and his plans on one side, off ran George Stephenson; as he neared the pit's mouth, he heard the cries and shrieks of the horrified women, whose husbands and sons were working below. 'Oh! the numbers that are below! the numbers that are below!'

"'Stand back, and give me place,' exclaimed Stephenson; 'I am going down to join them.'

"'Down! why you are going to certain death,' remonstrated the engine-men.

"'Lower me instantly; there is not a moment to be lost,' was the stern reply, and springing into the basket, in an instant he disappeared down the pit's mouth. As he touched the ground he saw the extent of the danger, and how it could alone be remedied.

"'Are there six men,' he exclaimed, looking round on the terrified group of workmen, who were crouching to the ground in vain hope of safety from the coming blast,—'Are there six amongst ye, who have brave hearts and strong arms? if so, follow me. We will stop the flames, or we will perish in the attempt.'

"Roused by that ringing voice, animated by that brave and daring spirit, the men eagerly volunteered to follow wherever he would lead the way.

"It was a frightful peril; one instant too late and they

were courting death. Stephenson's plan was to build up a wall of solid masonry between themselves and the approaching flames, defy the destroyer face to face, and stay him in his victorious march. All the materials that he required were fortunately at hand; silently and earnestly the men held to their work; nearer and nearer came the enemy, but not one man flinched from his post, till the last stone was placed, and then they paused, and gratefully thanked God for their wonderful preservation, and honoured him whose courage, under Heaven, had alone saved their lives.

"Not content, however, with having stayed the immediate danger, Stephenson turned his thoughts in earnest to how the risk might be best averted in future. To accomplish what he wanted was very difficult; for he must have a bright light, and yet one which could in no way communicate with the outer air; and how was this to be effected? as, of course, no light would burn brightly except the flame was fed with a certain amount of air, and if he admitted the necessary draught, how was he to prevent its coming in contact with and igniting the noxious gases? Books he had none to help him, for in this case there were none written on the subject. It was just at the very moment when the attention of scientific men was being roused to its im-

portance, by the succession of lamentable accidents so constantly occurring. Sir Humphrey Davy had been asked to turn his especial attention to the matter, and he had promised, if possible, to construct some instrument which might obviate the danger.

"But Stephenson knew nothing of this, nor had he any of the scientific knowledge which was guiding the researches of Sir Humphrey. He had nothing but his clear head, strong common sense, and accurate acquaintance with practical mathematics. Carefully noting the causes of explosion, and the different currents of air through the mine, Stephenson came to the conclusion that if he could contrive a lamp with a long chimney, and with tubes which could produce a sufficient current of air, he should attain his object. His only doubt was how much of the outer atmosphere must be conveyed to the light itself to make it burn. However, this he must test for himself, and without loss of time he set to work upon his new invention.

"At length the lamp was completed, and in company with two of his most intimate friends Stephenson descended into the mine to make trial of its power. By previous arrangement a small portion of a very dangerous part of the pit had been boarded off, that the gas might escape into it in large quantities, and thereby

test to its utmost the powers of the lamp. It was a fearful moment; suppose the lamp was proved insufficient, certain and immediate death must be the fate of all three.

"'It is too hazardous,' exclaimed one of the party. 'Let us go back, it is tempting Providence.'

"'No, no,' exclaimed Stephenson, 'I am confident of the power of the lamp; besides, it must be tested; the trial is worth the risk: it is one man's life to save a thousand. Go you back, I and my lamp go forward together.'

"The men looked at each other for a moment in silence, but the risk was too great, and their courage was not proof against the dreadful ordeal; they went back to a place of safety, whilst their calm, brave, dauntless companion passed on, and was lost to their sight in the surrounding darkness. His own heart may have beaten more quickly, but his hand never trembled as, having reached the place of trial, he held out his lamp, and placed it in the full current of the noxious air. His companions meanwhile awaited in breathless suspense the sound of the explosion which was to tell them that their brave friend was no more. Minutes seemed like hours, and then they heard the sound of a footstep, and then the cheery well-known

voice that told them all was right. 'Come, come, see for yourselves,' he said, 'it is quite safe, never fear, come and judge.' Following Stephenson, at a very prudent distance however, they saw him go up to the dangerous spot, and coolly hold out the lamp. The flame brightened, flickered and went out, but no explosion followed. Clearly it was safe. Half the battle was won. All that was now required was to find the means of keeping alive the light, and the friends returned together to Stephenson's cottage to discuss how this, the remaining portion of their work, might be effected, thankful for their own wonderful preservation, and rejoicing to think that at length a means had been found by which the lives of thousands might be rendered safe, and more than ever honouring the man who could thus calmly make sacrifice of his own life, if need be, to promote the well-being of his fellow-creatures."

"What a grand fellow he was!" exclaimed Ernest. "He was something like a man."

"He was, indeed," replied Mrs. Grenville, "it is quite refreshing to know that such men have lived in our own days; we are apt to think when we read of heroic and of noble deeds in history, that they belong to a generation quite passed away, having nothing what-

ever to do with us, and so we lose half the benefit of their example; whereas when we hear of those living amongst ourselves, our very own countrymen, doing such brave deeds, we feel that for very shame we must try and imitate them, or be content to rank amongst an inferior class of men."

"And did Stephenson find out how to make the lamp burn, mamma?" inquired Arthur.

"Yes, after much thought and many experiments he at length hit upon a plan by which the poisonous air which extinguished the light might be discharged, and pure air introduced through tubes to keep alive the flame. The plan was tried, and with perfect success; and thus before Stephenson had ever heard of Sir Humphrey Davy's lamp, and in fact, before Sir Humphrey himself had begun to construct it, 'the Geordie Lamp,' as it was termed, was in actual use in the Northumberland coal pits. Unfortunately for Mr. Stephenson's fame, whilst he at the risk of his own life had been working out his problem practically, Sir Humphrey Davy, with every aid that science could afford to his really fine intellect, had come to a theoretical conclusion precisely similar. The lamp which he exhibited at the Royal Society was more neatly put together because he could command the help of all the most skilled workmen in

England, but the principles on which it was made were so identically the same with those of 'the Geordie,' that when it was first shown to the Killingworth pitmen they exclaimed, 'Why that is Stephenson's lamp.'

"However, Sir Humphrey Davy was at that time the admired of all men, and looked upon as one of the great lights of the age, whilst George Stephenson was merely a workman, or at best an unknown engineer. When, therefore, some of his friends came forward and claimed for him the honour due to his invention, the idea was simply laughed at and put on one side. But Stephenson was not a man to allow himself to be quietly laughed down. He did not wish to claim for himself one iota more merit than he deserved, but right should be done to him as much as to another, so quietly and firmly he held his ground; 'only let the matter be fairly sifted,' he said, 'and then let the praise rest with those to whom the praise was due.'

"As is often the case, the partisans on both sides took up the matter with undue warmth. Each would have claimed the entire merit for their own champion, whereas in reality both men were equally deserving of praise, and it was a thousand pities that a feeling of jealousy should have been fostered for a moment between two such rivals. The question became an embittered one,

nor was the matter mended when at a great meeting of all the principal men connected with the Northumberland mines, it was resolved that a splendid testimonial should be given to Sir Humphrey Davy, to mark their sense of the importance of his invention, whilst they merely presented George Stephenson with a hundred guineas, to show, as they said, that they were not unmindful of his exertions in the cause of humanity.

"But this did not satisfy Stephenson. He did not want the hundred guineas, but he did want the credit that he had so hardly earned; a number of his friends took the same view; a statement of the facts was published, and of course drew forth a rejoinder from the opposite side. Unfortunate as this controversy then appeared, it has perhaps had the advantage of enabling us, now that all heat of partisanship has passed away, to judge clearly between the merits of the two men, and without depreciating either, to be thankful for the blessing bestowed upon the miners by the scientific knowledge of the one, and by the practical experience and clear-thinking, hard-working perseverance of the other.

"Not content, however, with giving to the world the true history of Stephenson's invention, his friends determined to present him with some tangible proof of

their admiration and regard, and in a manner most peculiarly gratifying to Stephenson, they begged his acceptance of a silver tankard and one thousand guineas, as a slight mark of the estimation in which they held his high qualities both of heart and head.

"This money came just at the right moment. Robert, his darling boy, had grown up all that his father's fondest wishes could desire. He had now been for about two years working with his father at the mines, the greatest possible assistance to him, for not only was his knowledge of every part of an engine so complete that Mr. Stephenson could leave him fearlessly in the entire charge of the most complicated works, but Robert was just as much interested as Mr. Stephenson himself in the construction of a perfect locomotive, and his accurate drawing, and quick, ready power of suggestion, were of the greatest value to his father in preparing his different plans and models. Nothing was a trouble to him, his energy was untiring. That it was right that such and such a thing should be done was quite sufficient; no matter what self-denial it entailed, the sacrifice was cheerfully made, and for weeks together he would be up between two and three in the morning, steadily at work at his engine, intent merely on doing his present duty and doing it well.

"To lose such an assistant and such a companion might well seem to Stephenson an irreparable loss, but no sooner did he receive the thousand pounds, than he made up his mind that part of it should be devoted to sending his son to college. He understood too well, in fact, this Davy controversy had shown him, the immense disadvantages that he laboured under for want of a university education, and of the standing it always commands in the world. Robert should be spared this trial at least. He should start on an equality with other young men of his day, and in his heart he prophesied he would shoot ahead of them with the speed of his own locomotive. So Robert went to Edinburgh, and Mr. Stephenson endeavoured to reconcile himself to his loss by devoting himself more than ever to the perfecting of his unwieldy favourite, of whom people were apt to say, as they shook their heads gravely, 'Ay, but there will be an awful blow up some of these days;' and so there was, but not exactly in the sense they intended; not many years and the prejudices of the ignorant and the forebodings of the learned were alike blown to pieces by the practical knowledge of the self-taught engineer.

"Just at the present moment, however, a fresh difficulty was thrown in Stephenson's way, by a very general notion that steam-carriages could be so con-

structed as to travel along the common highway, and the attention of all the best engineers of the day was directed to seeing how this might be effected. Stephenson, however, said from the first that they were trying to accomplish an impossibility, for that the inequalities and roughness of a common road would offer too great a resistance. If they desired to make steam power really available, it must be by finding a perfectly smooth level on which the engine might run. He was met by the reply the engine wheels would not bite, consequently the engine could never be propelled forward. 'This was a mere popular delusion,' Stephenson replied, 'give him only the opportunity, and he would show that it was.' There was no use arguing with Stephenson, he was so determined; so the engineers shrugged their shoulders and pitied his ignorance, and Stephenson, caring little for their silent contempt, worked quietly on at an undertaking, by which, as he truly said, 'he would revolutionize the world.'

"Certain that he was right in the principles on which he meant to work, Stephenson's first care was to improve the line of rails on which his engine ran; one improvement suggested another, and at length, in 1819, the locomotive at the Killingworth mine had been proved such an undoubted success that Stephenson was

applied to by the owners of the Hetton colliery to construct a line of about eight miles long, which was to be worked entirely by his locomotive engine. This was his first great triumph, the first public recognition of the truth of his theory. Stephenson set to work with a hearty good-will, and on the 18th of November, 1822, the Hetton railway was opened; and amidst the cheers of hundreds of spectators who had assembled to witness the novel sight, the engines started from their post, dragging after them long trains of heavily loaded waggons."

"And how fast did they go?" asked Ernest.

"About four miles an hour."

"Oh, only that."

"That was considered fast in those days. But a new and far more important success was now awaiting Stephenson," continued Mrs. Grenville. "You remember, I suppose, what an immense impetus had been given to the cotton trade by the inventions of Arkwright, and the engines of Watt."

"Oh yes, of course," exclaimed the children, "we remember."

"One of the consequences that naturally resulted, was the greatly increased importance as mercantile cities of Manchester and Liverpool, and the absolute necessity of

finding some means of more rapid communication between the two. All the principal traffic had hitherto been carried on by means of the Bridgewater Canal, but not only was this a very slow means of transit, but it was utterly impossible to find boats sufficient to convey the quantities of goods, which for want of means of transport were lying idle, or, worse still, rotting in the different warehouses. Something must be done, and that speedily, or the tide of advancing commercial prosperity would be stayed. A very clever, though somewhat speculative man, a Mr. James, suggested that a tram-road, to be worked by horses, should be constructed between the two cities. Whilst, however, matters were still pending, Mr. James was told of the wonderful engines that were working at the Killingworth collieries, and of the still more wonderful man who had made them. Mr. James immediately determined to pay a visit to the mines himself, and judge of the truth of what he had heard. He was equally delighted with the engine and the engineer, declaring that the one would attain to the celebrity of Watt, and as to the other, that there would be no limit to the wonders it might perform. From that moment he became one of Stephenson's staunchest adherents, and would gladly have obtained his assistance in the imme-

diate construction of a railway between Manchester and Liverpool, but the storm of opposition the mere proposal of such a plan excited amongst all the most influential landholders of the neighbourhood was too strong for Mr. James and his small knot of supporters; for the moment, therefore, the plan was stopped. But it only went to sleep, refreshing itself till the time for action should arise, and meanwhile there was plenty of work cut out for the indefatigable engineer.

"In tracing the wonderful ways of God, I have always been deeply impressed with the fact, that when any great change is destined to take place in the world, or any great benefit is about to be conferred, exactly the right men are raised up in the right place. It should teach us, I think, both thankfulness and humility. Thankfulness, if in any measure we are chosen to co-operate in the good work; humility, in that we see that our finest talents are but as instruments in God's hands, by which He works out his own foreordained and unalterable plans, becoming to ourselves a blessing or a curse, in so far as we account them of value for God's glory or our own.

"Just at the very moment when George Stephenson was wanting a more ample field for the development of his great discovery, he was brought into connexion with

the man most suited to give him the assistance he needed. Mr. Pease, of Darlington, was one of those shrewd, clever, large-hearted men, true sons of the North, who puts us more effeminate Southerners to shame with their energy.

"Mr. Pease had been for some time impressed with the great advantages which would accrue to his native place, if he could open up a ready means of transporting the coal from Darlington to the neighbouring seaport town of Stockton. His notion was to lay down a tram-road between the places, and after considerable difficulty he procured the necessary Act for enabling him to carry this into effect. One night, however, before any operation was yet begun, he was told that two men wished to speak to him on business, and on going into his study, he was met by a clever, intelligent, thoughtful-looking man, who without any excuse or preamble introduced himself as George Stephenson, 'an engine-wright,' who was anxious to speak to Mr. Pease about this new tram-road, which he was on the point of making, and which he thought might be changed into a railroad with immense advantage to all the parties concerned in the undertaking.

"Mr. Pease was somewhat taken aback by such a very bold innovation on his plan, and made by a

perfect stranger also; and yet there was an earnest, straightforward truthfulness about his visitor, that impressed him greatly in his favour. Begging Stephenson to be seated, he went into the whole subject at great length with him; listening most attentively to all that Stephenson urged in support of the pretensions of his pet locomotive; and at length when Stephenson concluded by saying, 'Come and judge for yourself, seeing is believing!' he promised to accept the invitation, and take an early opportunity of coming over to Killingworth, to examine for himself the boasted powers of the travelling engine. True to his word he kept his appointment; Stephenson put the locomotive through all its accomplishments, and so satisfied Mr. Pease of the truth of all that he had told him of its powers, that he became as ardent an admirer of the engine as Stephenson could possibly have desired; and from that day forward was indefatigable in his efforts to bring into public notice both the workman and the work; and so strenuously did he advocate his cause, that he persuaded the gentlemen who were connected with him in the management of the Darlington and Stockton tram-road to reconsider their plans, and obtain a new grant from Parliament, by which they might be allowed to construct a rail-

road instead, and work the line with the locomotive engine.

"This done, Stephenson was appointed engineer, and set to work with a hearty good-will, to find levels and make all things ready for this his first real trial of the feasibility of his long thought-of scheme. With earliest dawn he used to be up and out, hard at work surveying and measuring, and not till day closed in did he return to take either rest or refreshment, except such as was offered to him at any of the farm-houses by which he passed. His kind manners, and the readiness with which he could adapt himself to all circumstances, made him a general favourite; people were only too glad to offer him the best of what they had, and thought themselves well repaid for their hospitality, as they listened to the fresh, racy stories of their guest. But full of fun, and light-hearted as he might have seemed to the world at large, this was in reality a time of anxious thought. Stephenson was quite aware how much the future success of all his most cherished hopes hung upon the prosperous issue of his present undertaking. If the locomotive were tried now, and found wanting, good bye to all his darling projects; if, on the contrary, it succeeded, there were no bounds to his ambitious views for its future. Day and night he

pondered over the subject, inventing, contriving, altering, improving; as usual, cheered on and aided by his energetic son. But, alas! at this moment even this son was an additional anxiety.

"Anxious to improve to the very uttermost the advantages he well knew his father had earned for him so dearly, Robert had studied so hard, that even his fine constitution seemed giving way. He might carry away prizes, he might earn applause, but what were these to Stephenson, if they were to be bought at the price of the health of his darling boy? Perhaps, then, he almost doubted how far he had been wise in urging on a spirit already quite sufficiently ardent and ambitious. However, the mischief was done; the point was now to find the remedy. Fortunately, just at this moment an appointment was offered to Mr. Robert Stephenson, to take the management of some silver mines at Máraquito, in Columbia. To lose the assistance of his son just at this critical juncture of affairs, when he most needed his ready and able co-operation, was a sad blow to Stephenson; but he never for a moment hesitated. The warm climate of South America, the change of scene and occupation, were pronounced to be the best possible hope of entirely re-establishing Robert's health. Stephenson was therefore only anxious that the appoint-

ment should be accepted, and Robert leave England with as little delay as possible.

"It must have been a great pleasure, however, both to father and son, that already considerable progress had been made in the construction of the Darlington railroad; and the engines which were being made under the superintendence of Robert himself, at the Newcastle manufactory, were already far advanced towards completion. So greatly, however, did the directors of the railroad misdoubt Stephenson's powers, that they would only give an order that three of the locomotives might be made. Mr. Pease, indeed, who had now the opportunity of being constantly in the society of Stephenson, and who was daily becoming more and more impressed with his strong judgment, indefatigable energy, and clear good sense, urged upon the company that they might safely trust themselves to follow implicitly the advice of their engineer. It was not, perhaps, to be expected that a body of men would consent to be guided implicitly by a man, who, whatever they might think of him, was pretty generally considered to be an enthusiastic visionary on his one favourite subject. They considered themselves quite sufficiently generous in having allowed him to mount his hobby at all. If they did not put him under certain restrictions, who

knew but that he might ride it to death, and they and their concerns to destruction? So they gave orders for buying up a large number of horses who were to work the road in connexion with the locomotives. Stephenson did not attempt to prevent it. 'Let them buy the horses if they like,' he said, 'he had a pretty clear conviction in his own mind, that his locomotives would soon deprive the unfortunate animals of their post.'

"And now a new idea occurred to him, or rather he ventured now for the first time openly to broach it. If the locomotive could drag coals, why could it not drag human beings? If it was a convenience for the goods to travel fast, surely it was a much greater convenience to their possessors. Why should not a passenger carriage be attached to the train that was to make the first trip between Darlington and Stockton? It was a very bold idea then, though it seems simple enough to us now; but in those days a locomotive seemed little less dreadful than an infernal machine, and courageous must have been the heart, and strong the nerves, that would volunteer to trust themselves to the tender mercies of the monster. People would have thought it quite as sensible to have taken their seats on the crater of Vesuvius, whilst an eruption was every moment impending. However, Stephenson gained his point, permis-

sion was given to build the carriage, and he did not doubt that when the time came he should find people bold enough to fill it. For himself, the nearer the day drew for the opening of the railway, the more and more confident he became of success. Just before his son left England, he went over the works with his father to take a parting glance that all was right, and on their return from their tour of inspection, Mr. Stephenson ordered a bottle of wine, that he, and his son, and a young friend, who was with them, might drink success to the locomotive.

"'Yes, lads,' said Mr. Stephenson, 'I am getting old, and may not live to see it, but you are young, and in your days, trust me, the railway will be the great highway for the whole kingdom. For the time is coming when it will be cheaper for a working man to travel by rail than to walk on foot. It will drive every coach off the road, and will be the one great means of conveyance, whether for the king or for his people.'

"It was well, perhaps, for Stephenson, that these words were only spoken to the two ardent young men, who could respond to every syllable he said, and most heartily believed in the truth of his prophecy. Had the directors been present at the time, they might have trembled for their interests committed to the care of a

monomaniac. And yet, enthusiastic as Stephenson was in the cause of his favourite, even he would have shrunk from the boldness of the assertion, had he been told that not thirty years would have elapsed before the whole country of England would be one network of railroads, and his engines flying over the ground at the rate of sixty miles an hour. Never was such a revolution wrought in the whole framework of society, and mainly by the strong will and far-sighted genius of one energetic man.

"However, I am taking rather an unfair peep into the future; there is plenty of engineering work to be done yet, before we shall have levelled the difficulties, and smoothed the inequalities of the road.

"The first great step in the right direction was however taken, when, on the 27th of September, 1825, amidst crowds of spectators, many of whom were drawn together by the excitement of seeing 'the great blow up,' the Darlington railway was opened in all state. Flags flew, bands played their liveliest tunes, the devoted adherents of Stephenson risked their lives for his sake, boldly stepping into the carriages prepared for them. Stephenson himself mounted the engine, determining that he would drive it; his the post whether of honour or of danger. There were a few moments of

intense excitement, and the crowd with hushed breath awaited the given signal. Hark! there it is; and amidst the shrieks of the engine and the excited cheers of the crowd, off starts the locomotive at the frightful speed of twelve miles an hour. Alas! for the unfortunate passengers, they must have thought they were being whirled to destruction. The excitement with which the arrival of the train was expected at Stockton was little less than that which had watched its departure from Darlington. Would it ever arrive at all? Suppose the engine had blown up by the way, destroying itself and all connected with it. How every eye must have been strained in the direction of the coming train, to catch the first faint puff of steam against the far horizon.

"'Here, here it comes, yes, here it is;' and amidst the deafening cheers of the people Stephenson reined in his fiery steed, and descended from his fatiguing and arduous post, to receive the hearty and well-earned congratulations of a crowd of wondering admirers."

"Oh! but, mamma," exclaimed Arthur, "what a pity that Robert was not there. How happy he would have felt, and how proud of his father."

"He would, indeed; it must have been a great disappointment to them both. However, it is perhaps better

for us that we cannot have all we wish for in this world; and God mercifully blessed the means taken for restoring the son's health, and sent him back to his father at a time when he really needed him much more than in this his hour of success. It would take too long for me to tell you about that to-day. When I have time you shall know the very important results which followed on Stephenson's first great triumph of engineering skill."

CHAPTER VIII.

Projected railroad between Manchester and Liverpool—Difficulties—Stephenson appointed engineer; displaced; reappointed—Trial of the locomotive [1].

"MAMMA, I do not think you are doing any thing particular, are you?" asked Ernest.

"No. Why do you ask?"

"Because we want to know what became of Mr. Stephenson and his locomotive."

"You may come then, and I will try and satisfy your curiosity."

"Oh, thank you," exclaimed Ernest, and off he ran to call Charles and Arthur.

"I want to know," said Charles, "how long it was before the locomotives beat the horses off the rail."

"Some considerable time," replied Mrs. Grenville. "Changes of such magnitude as those proposed by Mr. Stephenson cannot be made in a day, even though at-

[1] See Smiles' "Life of Stephenson," pp. 208—298.

tended with the complete success that followed in this particular instance. So rapid, however, was the increase of the traffic on the line, both in passengers and in the carriage of goods, that Stephenson saw clearly some large accession of working engines would soon be wanted, and he knew that his own manufactory at Newcastle would be much too small to do the work required; but with the very limited capital he himself possessed, it became a subject of anxiety how the proposed alterations were to be made. In this perplexity he consulted Mr. Pease, who instantly removed the difficulty, by offering to become his partner in the new undertaking. This was in every way satisfactory to Mr. Stephenson; he and Mr. Pease thoroughly understood and appreciated each other; and he was overjoyed to find a partner so entirely to his taste. No time was lost in organizing the new establishment, and the best workmen who could be procured were soon in course of training for the construction of new and constantly improving engines; and to such skill did they at length attain, that years afterwards, when all the great continental and foreign railways were being made, there was not a nation in the world which was not anxious to engage in its service some one or more of the trained workmen from the then celebrated Newcastle manufactory.

"Hardly had Stephenson brought his first railway undertaking to its successful termination, when he was called upon to commence another and much more arduous work. You may remember that I told you that Mr. James and some of the principal merchants of Manchester and Liverpool had been anxious to find some rapid means of communication between the towns.

"Although the opposition they met with in first proposing the plan had induced them to abandon it for the moment, yet it was always present to the minds of Mr. James and others, and they only waited a favourable time for again bringing it forward. No sooner did they hear of the progress that Stephenson was making with the Darlington and Stockton line, than some members of the committee into which the Manchester and Liverpool gentlemen had formed themselves, determined to pay a visit to Darlington, and judge for themselves of the actual working and probable success of the line. So perfectly satisfied were they with all they saw, that on their return to Liverpool, they urged as strongly as possible that no time should be lost in obtaining from Parliament an Act which should empower the immediate construction of a railway between the towns; and as soon as their arrangements were definitely made they

unanimously begged that Mr. Stephenson would undertake the survey of the line, with an understanding that should the required grant be obtained he should be appointed their engineer.

"It was fortunate for them they made so judicious a selection; perhaps no other man in England could have brought them successfully through the innumerable difficulties with which they had to contend. You, who live in days, when to be near a railroad is considered the greatest possible advantage, increasing the price of property, and promoting in every way our comfort and convenience, cannot imagine the panic that the very name of a railway excited some thirty years ago. It was to bring ruin, destruction, death, to every thing it came near. The air was to be poisoned with the noxious smells of the engines; cattle grazing in the fields would die with fright at its hideous shrieks and squeaks. It would be no longer safe to travel on any road, near which a railway ran; for what horse could be trained to bear the sight of the infernal monster? There would be no end to the accidents and of the peril to life and limb; and as to the travellers on the line itself, who would be so rash as to trust themselves to a conveyance, exposing them, almost of a necessity, to a sudden and most awful death? And many went

further still, declaring that it was an impious daring of Providence to venture to propose a plan so fraught with danger to the human race."

"Oh! mamma. But were they educated men who could talk such nonsense?"

"Yes; men of the very highest education. It seems ridiculous to us now, because we have the advantage of living at a time when the problem is solved. Had we lived thirty years ago, we should most probably have thought as they did. And this should teach us to be careful how we laugh at the mistakes of others; for after all, it was natural enough that people should be afraid of a power they could so little comprehend. Even Stephenson's great friend, Mr. Wood, the man who had been his confidant from the very beginning, who had worked with him, hour by hour, and traced the progress of the locomotive from its very commencement, was anxious to throw from himself the responsibility and the ridicule, which he thought attached to the too sanguine expectations of his enthusiastic friend, and expressed as his decided opinion, that nothing could be more absurd than to affirm that engines could be made to travel at the rate of from twelve to twenty miles an hour. 'To promulgate such nonsense,' he said, 'will do more than any thing else to prevent their adoption and improvement.'

"Stephenson, however, thought differently. But it was only in a very small and select circle of his friends that he was able to give vent to his thoughts, and even they only listened gravely, just to please and humour a man whom they loved, begging him at the same time to keep his speculations for their especial edification; for there would be an end of all hope of carrying out their proposed plan of a railroad, if once his wild theories were publicly known. People would say he was mad; and who would trust their concerns to the tender keeping of a madman? Stephenson only laughed good-naturedly, and begged them to wait a few years before they pronounced a decided opinion on this subject, as he thought it was one of which he was more capable of judging than themselves; and meanwhile he devoted himself to the survey of the new line, and to making all the necessary calculations as to its probable expense.

"And now, for the first time, he felt the full force of the ignorant opposition with which he had to contend. Even in surveying the ground he had to dispute his way inch by inch. The great landed proprietors, through whose estates he wished to pass, having given the most positive directions, that neither he nor his men should be allowed to place foot on their pro-

perty, consequently, no sooner did he attempt to take his levels, than he was sure to find himself assailed by a group of bailiffs, or game-keepers, or labourers, as the case might be, who angrily warned him off the ground, at times threatening him with personal injury; at times destroying his valuable engineering instruments. There was one thing, however, of which they in vain endeavoured to deprive him; Stephenson never lost his temper; they might threaten to duck him, he laughed and gave them permission; they broke his instruments, well, he could get fresh. He must return whence he came; so he did, but it was only to come back again another way. You could not discourage him, for difficulties only gave him fresh energy. You could not affront him, for he had quite made up his mind he would not take offence. He was an impracticable man, there was nothing for it, but to let him go on and conquer. And thus, in spite of all obstacles, the survey was at last completed, and the Bill for the railroad went up to Parliament.

"But, here again, they were met with a fresh and more troublesome opposition than before. The very first lawyers in England were retained by the opponents of the measure, in the hope that when it went into committee their talent and eloquence might so

demonstrate the absurdity of the scheme, and so throw the company into such disrepute, that all idea of the proposed railway might be given up for years, if not wholly abandoned.

"But they did not know the man with whom they had to contend. Both sides were perfectly aware that the brunt of the struggle would rest with George Stephenson. If his adversaries could succeed in breaking up his evidence, good bye to the locomotive. If, on the contrary, he could hold his ground, its ultimate triumph was certain, though it might be for a while delayed. The knowledge of how much depended upon him, made Mr. Stephenson's first visit to London a remarkably anxious and disagreeable one; and he always after spoke of his first examination before the committee of the House of Commons, as one of the most painful ordeals through which he had ever passed, and no wonder: not an effort was left untried to turn him into ridicule, to bother and perplex him, and it is one of the most extraordinary proofs of his innate power and intelligence, that these efforts were so little successful. Here was a self-educated man, suddenly placed in a position such as he had never occupied before, every thing around him new, and strange, and startling, opposed to the most highly cultivated and

acute minds of the day, and required to be ready at a moment's notice to confute their most subtle objections. Well might he say, 'I had not been long in the witness-box, before I began to wish for a hole to creep out of.' He might wish it, but no one who saw him then would have divined it from his manner. With the perfect self-respect of a really great mind, he calmly endured the most rigorous and insulting examination. He knew he was no match for his opponents in eloquence, but he met their taunts and sneers with a practical demonstration of what he had already done, and replied to all their eloquent denunciations of his folly and wild enthusiasm, with such plain, good, common sense, as was of itself the best refutation of their accusations. There was only one point that did bother him, and that was, that his friends had most strictly forbidden him to make any allusion to the speed with which he prophesied the locomotive would travel.

"'All depends upon this examination of yours,' they said. 'Do then keep your wild, visionary speculations to yourself.'

"'But truth is truth,' urged Stephenson.

"'That may be; but even truth must sometimes not be spoken. We give you ten miles an hour, nothing beyond.'

"'Give me six times ten, and you will be nearer the mark,' replied their incorrigible engineer. 'But, however, you may trust me; I will keep it to myself, if I can.'

"And very hard he struggled to remember his promise, but it would not do; goaded on by the opposing counsel, he boldly stated the engine might run twelve miles an hour as easy as four. His friends trembled; his opponents triumphed. He had admitted a manifest absurdity, they said; but Stephenson, quite unabashed, calmly and emphatically repeated his statement. The utmost efforts of his adversaries were unavailing to break down his evidence on that, or any other point on which his own mind was made up; but they succeeded in so working on the fears and prejudices of the majority of the committee, that the Bill was lost for that session, and the railway directors had all their work to do over again.

"Stephenson was not disheartened; but he was, perhaps, the only man who was not. Even the faith of his best friends was shaken. They had heard him accused of such arrant folly and madness, that at last they began to think there must be some truth in such reiterated accusations, and to doubt how far they were wise to trust their concerns in his hands. They would

not give up the idea of their railroad, but they would confide it to the care of some one a little less speculative and enthusiastic."

"Oh! if they are going to take it away from Stephenson," exclaimed Charles indignantly, "I hope they will fail in every thing they undertake, and be beaten over and over again. What a shame!"

"I think it was a great shame," replied Mrs. Grenville. "They at least had had an opportunity of testing the soundness of Stephenson's judgment, by the success of the works he had already undertaken, and they should have had the moral courage to uphold the man of their own choice; fearful, however, of compromising their success in another session, they employed a very eminent engineer, Mr. Rennie, to survey the line again, taking rather a different course from that indicated by Stephenson, and making fresh calculations for the expense; and immediately on the meeting of Parliament, a Bill was brought forward for the construction of the railroad; and this time it was passed, though not without considerable opposition."

"Oh! poor Stephenson. How sorry I am for his disappointment," exclaimed the children.

"It was destined not to be so great as it at first

appeared," continued Mrs. Grenville. "Mr. Rennie, who was a man in full work, declined to take the immediate superintendence of the construction of the line; telling the directors they must be content with his occasional visits. This, however, did not satisfy them. They felt, truly enough, that such a novel and important undertaking would require the undivided attention of even a clever and energetic man. If, therefore, Mr. Rennie could not do the work himself, they should offer it again to Stephenson. Rennie was very angry; but there was no help for it; he must make his election. He declined the appointment, and Stephenson found himself in his old post; and with his usual energy he set to work without a day's delay, to discover the means of overcoming a difficulty which had been pronounced insuperable by the most eminent engineers of the day. Between Manchester and Liverpool the line crossed a great bog of four miles in extent, called Chat Moss, a place so utterly desolate, that no one had ever been wild enough to think of making a common road across it. The ground was so bad that you could only walk on it at all in the very driest weather, and the least pressure in the wet would sink you down to a depth of thirty-four feet. It did not sound hopeful for a railway certainly, and perhaps no

one but Stephenson would have been bold enough to attempt such an apparent absurdity.

"However wild, however, his plans might seem, they always stood on a firm basis of common sense. He had calculated that as a ship floats in water, so could a railroad be supported on a bog, if only he could get his rails to float. The point was, how to manage this; and he thought he had hit on the way: he cut drains, till he had drained away the water to a certain extent, and then contrived to make hurdles float upon the surface of the bog; ballast being placed upon them, and cross sleepers to support the rails. It sounds simple enough as I tell you now, but the difficulties were in reality greater than I can explain to you. It requires a practical engineer to understand the full merits of the work, or the anxiety which it cost Mr. Stephenson; sometimes the drains would give way, and his operations be all flooded. Sometimes the weight of the line would squeeze down the bog, and then it would not float; sometimes it seemed impossible that the world itself could contain rubbish enough to pour into the insatiable swamp, to make a firm and floating way. The directors were in despair.

"'What are we to do?' they exclaimed, as day followed day, and still there was no apparent progress made in the work.

"'Persevere,' replied Stephenson.

"And however often the question was asked him, still he met it with the same unalterable reply. Great was the joy of his opponents when they thought that at last they had their adversary in an inextricable fix. The most absurd rumours were every where rife; now it was said, 'Chat Moss had blown up;' now, 'That hundreds of men and workmen were engulphed and lost in the bog;' now, better still, 'That Stephenson himself had been swallowed up; and there was an end of his speculations for ever.' The wish was father to the thought. Whilst this gratifying piece of intelligence was circulating, Stephenson was putting the finishing touches to his great undertaking; and in six months from the time when a meeting of the directors had pronounced, 'The works must be abandoned, the thing could never be done,' the rails were all in their places, and those very directors speeding away comfortably in a railway carriage over that very bog which would have been considered for ever impassable, but for Stephenson's firm determination to keep to his motto, and to 'persevere.'

"Chat Moss once crossed, every thing else seemed easy by comparison. The faith of the directors was strengthened, and even those most opposed to Ste-

phenson thought twice before they openly criticized the proceedings of a man who had thrown a railway over an unapproachable swamp. People looked on and wondered what would come next, when neither the opposition of men, nor the apparently insurmountable obstacles of nature, had the slightest effect in turning the indefatigable engineer from his purpose. His greatest difficulty now, was to organize a body of workmen who could understand and execute his orders."

"Why, aunt," exclaimed Charles, "why did he not employ the navvies?"

"Because there were no navvies then, at least, not in the sense in which we now use the term, when we apply it to the men who are employed almost exclusively in the construction of railways; and a vigorous, energetic body of workers they are, with their own laws and regulations, and code of morality; but when Stephenson wanted help, he had to look out for it for himself; and with his usual judgment, he applied to a very strong, powerful class of men, who earned their livelihood by making canals and works of that description. These men were called navigators, a word afterwards corrupted into the shorter term, navvy, and were peculiarly well fitted by their previous habits of life for being formed into just such a band of workmen as

Stephenson required. However, although he had thus found the materials, he had to mould them himself into shape, and very hard work this was. He knew that precept without practice is of no worth whatever, and that if he wished them to become skilled artisans, he must see that they were well taught their trade; consequently he himself took part in their work, sometimes wheeling the barrows, sometimes using the pickaxe, or whatever might be the business in hand; explaining at all times the principles on which he acted to the men, and showing them how the greatest amount of labour might be effected with the smallest possible expenditure of time and strength. Nothing was too small for him to think it worth his closest attention; nothing was beyond the grasp of his mind. The consequence was, that he gradually trained a body of men, who have since become the wonder of the whole world, for their skill, their strength, and their indomitable energy.

"But extraordinary as were Stephenson's powers, there is a limit to all things human; he could not be every where at once, and he soon became painfully aware that if his time and attention were to be absorbed with his engineering work, his locomotive, the cherished favourite, on which his hopes of future fame depended,

Stephenson teaching the Navvies. P. 194.

These engines were to be built by a certain day, and tried upon the Liverpool line. If they answered, well and good; then the line should be worked by the locomotive; if they failed, it was only the delay of a few weeks, till the stationary engines could be erected.

"Stephenson was satisfied; all he wanted was a trial. Robert was again in England, and with his aid failure was impossible. Great was the excitement amongst the engineers as soon as the decision of the Liverpool board of directors was made known, and an eager competition was commenced as to who should get the most perfect engine ready by the appointed day.

"At Newcastle the best hands were pressed into the service, and under the superintendence of Mr. Robert Stephenson, the construction of a new and much improved engine went rapidly forward. It must have been an exciting time both to father and to son, as they talked over, and planned, and arranged, and rearranged every portion of the machinery of the 'Rocket.' How much both for them and for the world at large depended on the conduct of their favourite.

"At length the time of trial arrived. Of all the engines that had been constructed, only four were found to combine all the requisite qualifications; these were—

"Messrs. Braithwaite and Ericsson's 'Novelty.'

"Mr. Hackworth's 'Sanspareil.'

"Mr. Burstall's 'Perseverance.'

"Mr. Robert Stephenson's 'Rocket.'

"The ground chosen for the trial was about two miles in length, and each engine was to make twenty trips, the speed never being less than ten miles an hour. It was like a tournament in olden times, and crowds flocked from all parts of the country to see the engines enter the lists. Their powers were to be tested separately, and great was the excitement and endless the speculations as to who would be the victor. The suspense was not destined to last very long. The 'Sanspareil' was too heavy, consumed too large a proportion of fuel, and broke down on the eighth trip. The 'Novelty' burst twice. The 'Perseverance' had to be withdrawn altogether. On the 'Rocket' then, and the 'Rocket' alone, hung the fate of himself and all his race.

"Now, Stephenson, can you look on calmly and wait the result? Yes, you have faith in yourself and faith in your son. Get the engine ready and let her go. Ready? ay, ready. Backwards and forwards, backwards and forwards. Why, they cannot stop her. Cannot they? they are only testing her powers, she is going nine-and-twenty miles an hour now; wait, and

in a few moments you will see her come in at the goal as quiet and as well in hand as the gentlest pony that was ever obedient to a lady's touch. Well might the people cheer. Well might the directors chuckle inwardly, as they thought of raised dividends. Well might the father and the son rejoice in their success, as with calm self-respect they received the congratulations of all that numerous throng. They had done a great work, a work of which they had a right to be proud; for they had triumphed over ignorance and prejudice, and risen by the force of their own native power and worth over the still more insurmountable barriers of caste. From this moment not only was their position secured, but they had decided for ever the fate of railways and of the locomotive."

"Oh, I am so glad!" exclaimed Arthur; "I should have been so dreadfully disappointed if the 'Rocket' had broken down."

"What became of the 'Rocket?'" inquired Charles. "If I had been Mr. Stephenson I should have kept it for ever as a trophy."

"It did not belong to Mr. Stephenson," replied Mrs. Grenville, "it was built for the company, and worked on the line till 1837, when the directors most ungratefully sold it to make room for more powerful engines.

I think the least they could have done would be to give it back to Mr. Stephenson when they had no further use for it themselves. However, after many adventures and misadventures, it has found rest at last. A good many years after the Liverpool directors had parted with it, it was once again for sale; Mr. Stephenson himself became the purchaser, sending the engine to his Newcastle manufactory, and there it now stands a memorial for all time coming of the wonders that may be wrought simply by energy and perseverance."

"Oh, mamma, mamma, that is not quite fair!" exclaimed Ernest; "think what wonderful talent both Stephensons had, it was not only their energy and perseverance."

"But it was mainly owing to those qualities that they owed their success," replied Mrs. Grenville, "and either of the Mr. Stephensons would have been the first to tell you so themselves. Others have had quite as great, perhaps even finer talents, and yet have done nothing with them. If you ever hope to succeed as the Stephensons did, believe me, there is nothing for it but to work as the Stephensons worked."

"Well, Aunt Helen, we really have tried, have we not?" added Charles. "I am sure since you began

to tell us this story I have made more efforts to conquer my indolence than I ever did in my whole life before."

"If that is the case, I cannot do better than to say with Mr. Stephenson, 'persevere,'" replied his aunt, smiling; "and now you must run away and amuse yourselves, for I have got some letters to write, which must be ready for to-day's post."

Charles was not wrong; the account which Mrs. Grenville had given the children of Mr. Stephenson, his sayings and doings, had taken a wonderful hold on their imagination, and they were never tired of talking over all his adventures, and wondering how far in the same circumstances they should have acted as he had done. Their courage was destined before long to be put to the proof.

Charles had become so good a horseman that Mr. Grenville had no anxiety about trusting him to go out alone or only with Ernest, and the two cousins were in the habit of taking long rides all over the neighbourhood, and very much they enjoyed the freedom of their gallops. One day when they had been out rather longer than usual, and were returning home quickly to make up for lost time, as they were approaching a river which separated the parish of Helmstead from that in

which Mr. Grenville's property was situated, Charles suddenly checked his pony.

"Stop, Ernest! Ernest!" he exclaimed; "listen, do you not hear cries?"

Ernest pulled up as quickly as possible, and both boys listened intently. "Now, Ernest, hark, hark, do you not hear?"

"Yes, yes, I hear," said Ernest, as first a cry of terror and then a low smothered shriek was borne past them by the wind.

"It is from the river," exclaimed Ernest, "here, here, to the right, Charles;" and both boys galloped on as fast as possible in the direction from whence they heard the sound. As they neared the bank they saw a little girl standing in a perfect agony of terror, and crying as if her heart would break.

"He is in, he is in," was all she could gasp out through her sobs.

"Who is in?" exclaimed Ernest.

"My brother, my brother;" and the child pointed towards where a dark body rose for the moment to the surface. There had been a great deal of rain lately, the river was swollen, and the tide was running rapidly. Ernest was an excellent swimmer, but it required a stout heart to think of battling with that roaring stream; for

a moment he hesitated, then came the thought of George Stephenson to his mind, how he had dared death in the flames to save his fellow-workmen. All, all was done in far less time than it takes to tell, as turning to his cousin, he exclaimed eagerly,

"Charles, ride off, as fast as the pony can lay legs to ground, there to that farm yonder, tell them to bring help, a boy is drowning."

Without waiting to know his cousin's intention, Charles galloped off to do his bidding. Ernest had taken his resolution; he rode rapidly forward so as if possible to head the current, and meet the body as it was floating down. Then springing from his pony, he plunged gallantly into the stream; it was stronger than he had calculated upon, and in spite of his utmost efforts it bore him down. Excitement and his strong will gave him for the moment unnatural power, and just as he had succeeded in breasting the flood, to his unspeakable joy the body, of which he was in search, came floating by; striking out bravely he grasped at it with his hand, and succeeded in catching hold of the collar of the poor boy's coat. It was perhaps fortunate for both that life seemed to be extinct. Had the lad struggled, or had he clasped Ernest for protection, both must inevitably have perished; as it was it was a hard

matter to fight his own way against the stream, upholding as he did so the head of his unfortunate companion. His strength was visibly decreasing, his breath came thick and painfully, and his eyes were growing dim and hazy. But that brave young heart within him never quailed or trembled. "God be with me," passed his lips more fervently than perhaps prayer had ever passed his lips before, and God was with him, and just as Charles returned with succour from the farm, Ernest had drawn his insensible burden from the water, and faint and trembling had sunk down exhausted by his side.

Most fortunately a medical man was paying a visit to a sick patient at the farm at the very moment when Charles arrived there; not an instant was therefore lost in obtaining prompt and effectual succour.

It was only just in time, a little more and the last spark of life would have been extinguished.

"But, my boy, we must not forget you," said the farmer, turning to Ernest, when under the direction of the medical man the unfortunate lad had been conveyed to the farm. "Come in, we must find something warm and comforting for you. I do not know who you be, but you be a fine, brave, plucky fellow, that I will say for you."

"I am Ernest Grenville," replied Ernest, quite simply.

"Sure! what, the squire's son? then I wish him joy of such a lad," and the honest farmer held out his hand, giving Ernest's such a shake as might have sufficed of itself to restore suspended circulation.

But he did not content himself with this manifestation of his regard. He took him up with him to the farm, ordered a warm bath for him as quickly as possible, a thorough rubbing, and a glass of good, strong, hot cordial, which he mixed for him with his own hand, and as Charles was very unwilling to leave his cousin, and also very anxious to know the fate of the boy whom Ernest had rescued, the farmer put the finishing touch to his kindness by sending off one of his own men on Charles's pony to the Grange, to tell Mr. and Mrs. Grenville that the boys were in safety, and to beg that a carriage might be sent to take them home.

Very much restored by the farmer's treatment, Ernest's only thought was now for the poor boy, and great was his delight, when, after a period of lengthened suspense, which seemed endless to the cousins, the medical man at length pronounced that animation was returning, and with God's blessing he thought there was no doubt the boy's life would be spared. Then,

and not till then, it flashed upon them all of a sudden that they had forgotten the little girl, and Charles, who thought he had not taken a nearly sufficiently prominent part in the events of the day, volunteered instantly to go in search of the unfortunate child. But the farmer would not let him go alone, and so in company with one of the labourers he proceeded, not without serious qualms of self-reproach for his forgetfulness, to endeavour to find the poor child. He had not far to go; overcome with grief and terror, the poor little thing had sat herself down under a hedge near where they had left her, and there leaning her head upon the bank, she had fallen fast asleep, the wild flowers her pillow, and the deep blue sky her covering.

"Poor little thing, do not let us wake her," said Charles, "she will only fret, and we are not quite sure yet whether her brother will live or die. I think I can carry her."

"No, no, young master," said the man kindly, "I am more fit for that work than you, you lead on and I will follow;" and lifting her up in his arms, he and Charles returned to the farm in time to hear that both Mr. and Mrs. Grenville had arrived, and that Mr. Fortescue pronounced that his patient was entirely out of danger.

He was not well enough, however, to speak. It was therefore to the little girl they must look for information as to who they were and whence they had come. When first, however, the poor little thing had awoke, she was so frightened they could make nothing out of her account, but gradually Mrs. Grenville's kind, gentle manners so won upon her affections, and soothed her fears, that she elicited sufficient information to understand that her name was Danvers, that she and her brother were the children of a clergyman, that they were staying with an aunt who lived about two miles from Helmstead, that they had permission to go and fish in a pond near the house, but that some boy had said there was better fish in the river, and so they had gone there to try their luck. She did not know how Alfred had fallen in, she saw him fall, and heard him cry, and then the stream went round, oh, so fast, so very fast, and she thought he was swallowed up, and she screamed as loud as she could, and then two boys came galloping up and she knew no more, they went quite out of her sight, and she was afraid to follow, and she stood and cried till she could cry no more, and then she sat down, and she could not recollect any thing else till she found herself in that room and sitting on Mrs. Grenville's lap.

Mrs. Grenville's first thought was for the unfortunate aunt, and the anxiety she must be enduring. Finding from Mr. Fortescue that young Danvers might now be safely moved, she proposed to her husband that she should at once take the children home and return and call for the boys and himself, Mr. Fortescue kindly promising to accompany her and see that his patient was properly cared for. As to the farmer, he scouted all idea of any sort of remuneration, he was only too glad to have had the opportunity of doing a kind act, and as to what he had done for the young squire there, he said when he again shook his hand heartily at parting, "I hold it not only a pleasure but an honour to have shown him hospitality. We want more of such young chaps among us, fellows who have not only the heart to do a bold deed, but the modesty not afterwards to brag about it. I wish you joy, sir, of your son, and long life to you both."

Oh, how happy Ernest felt as he caught his mother's proud, fond glance, and in his inward soul he thanked God who had given him power to do the deed.

CHAPTER IX.

Opening of the Manchester and Liverpool line—The Birmingham line—Difficulties overcome by Mr. Robert Stephenson[1]—Anecdotes of Mr. George Stephenson in later life.

NATURALLY enough the boys could think and talk of but little else than their adventure, and Mrs. Grenville promised that if the next day was fine they should ride over to Helmstead directly after breakfast, and inquire how young Danvers was going on. Almost before it was light Ernest and Charles were up and examining the state of the weather. They might as well have stayed in bed, for had they listened they would have heard the wind howling and the rain beating heavily against the windows. Oh, what a dull, leaden sky, not a break to be seen all round the horizon. There was but one comfort, it was pouring so violently, surely it could not last. Why, what had bewitched the weather?

[1] See Smiles' "Life of Stephenson," pp. 298—444.

Hour followed hour, and still steadily, incessantly, drip, drip, drip, fell the rain.

"Now, Aunt Helen, is not this enough to try any one's temper?" exclaimed Charles, as, breakfast over, he was standing at the window, vainly endeavouring to persuade himself and others that the weather was certainly taking up; "this rain is really quite unbearable."

"It is very disappointing, certainly."

"Oh, Aunt Helen, it is much more than that," replied Charles, somewhat provoked at the quiet tone in which Mrs. Grenville spoke; "it is utterly unendurable, not but that I think if we were to put on our mackintoshes, and ride very fast, we should not come to any harm. It does look a little bit clearer; look here, Ernest, do you not see something like blue sky?"

It required more imagination than Ernest possessed to find it out, and Mrs. Grenville entirely objected to their going out in such heavy rain, even with the utmost protection that mackintoshes could give.

"And after putting Mr. Hervey off, and all," said Charles, "it is too annoying."

"Why, Charles," replied his aunt, smiling, "how long have you felt it an annoyance to be excused doing

'that horrid Latin and Greek, or that wretched stuff Algebra, that I can make nothing of?'"

"Aunt Helen!"

"Well, my love, that seems to be your present grievance."

"No, now, Aunt Helen, you know it is not that."

"Is it not? it seemed so. I am afraid it will not clear up yet," added Mrs. Grenville, "if that is what you are vexed about, and losing your temper will not mend the matter. It will only make yourself and every one about you as miserable as the weather. Either amuse yourselves in the study, or if you like it better, I will tell you how Mr. Stephenson followed up his successful experiment with the 'Rocket.'"

"Oh, do, mamma, if you can spare the time; that is what we shall like best," exclaimed Ernest and Arthur, whilst Charles took his drawing and sat playing with his pencil, looking very glum, and not saying a word.

"Was the railroad finished, mamma," inquired Ernest, "at the time when the engine race came off?"

"No, not quite; as soon as a portion of the line was ready for the experiment, the directors had wished that it should be tried, as of course their plans for the future depended mainly on the result. The success of the 'Rocket' had been so unquestionable, that the company

decided instantly that the line should be worked entirely by the locomotive, and orders were given to Mr. Stephenson to build engines and carriages with as little delay as possible. At length all was ready, and the 15th of September, 1830, was fixed upon for the public opening of the line, and to add to the importance of the occasion, the Duke of Wellington, who was then prime minister, with several members of his government, promised to come down to Liverpool to be present at the ceremony. Some hundreds of guests were invited, and a grand procession was to start from Liverpool; all the engines of the line being put into requisition, each with its appointed number of carriages. The 'Northumbrian,' which was to draw the train prepared for the Duke of Wellington and his distinguished party, was to be driven by Mr. Stephenson himself, whilst the 'Phœnix' was to follow immediately afterwards, under the guidance of his son. Nothing could be better than all the arrangements, nothing more auspicious than the start, as amidst the cheers of the assembled thousands the train glided out of the station, and sped along at the rate of four-and-twenty miles an hour.

"Had they only continued their journey direct to Manchester all would have been well. Unhappily it had been arranged that the train should stop at Park-

side, midway between Liverpool and that town. Here it was to be drawn up on one side and the locomotives were to pass by in grand procession that the Duke and his party might have an opportunity of seeing their extraordinary power. Amongst the members of the government was a Mr. Huskisson, a very clever man, who from the first had taken a great interest in the success of the locomotive, and had now gladly accepted the invitation of the directors to be present at this first great public testimony to its success.

"On the arrival of the train at Parkside he had got out of his carriage, wishing to speak to the Duke of Wellington, who was in another compartment. Hardly, however, had he reached the carriage window when a loud cry was raised,—

"'Take care, take care, get in, get in, the engine is coming.'

"Looking hastily round Mr. Huskisson perceived that the warning was only just in time, for that the 'Rocket' was approaching at a rapid pace. People were not then so much accustomed to railway travelling as they are now, and the strongest nerves gave way at such unusual sights and sounds. Mr. Huskisson turned hastily round, hoping to regain his carriage before the engine could come by. Alas! in his hurry and con-

fusion his foot slipped, the 'Rocket' dashed by, throwing him to the ground and crushing his leg to pieces. It was all so instantaneous that not till the mischief was done were people even aware that the accident had occurred. Then, however, the panic and dismay were universal. Mr. Huskisson was lifted from the ground still alive, but in a dying state, and in five-and-twenty minutes, thanks to the power of the 'Northumbrian,' he had been carried back fifteen miles, and placed within reach of the best medical advice the neighbourhood could afford. But it was all of no use, poor Mr. Huskisson sank rapidly, and before night he had breathed his last. I cannot give you any idea of the sensation excited by the news of this sad and sudden death. One of my own earliest recollections is seeing my father's look of grief as he came into the drawing-room, and told my mother, 'Huskisson is killed.' I remember listening with a sort of hushed, breathless awe to his account of the accident. People had been so building on the wonders that this new steam power was to perform, the railroad had so excited their imagination as to the changes it was to effect, that Mr. Huskisson's death seemed a sort of national calamity, rekindling fears that had been nearly allayed, renewing the doubts of the scrupulous, and once again lending weight to the

arguments of the objectors; and it was not until the Liverpool and Manchester line had been for some time working steadily, and without the recurrence of any similar accident, that the minds of the people became tranquillized, and they could be persuaded to think favourably of the construction of the new railroad which was now being planned between London and Liverpool.

"This was a much more formidable undertaking, not only from its great length, but from the very difficult nature of the ground over which the line must pass, and all these difficulties were enhanced tenfold by the vexatious and ridiculous opposition that was offered, not only by the landowners, but by the corporations of many of the great towns near which it was proposed to bring the railway. Never was a better illustration of the way in which persons almost invariably outwit themselves when they yield up their judgments to their passions and their prejudices.

"The opponents of the Bill united, and organized so powerful an opposition that they carried their point, and the railway company abandoning their original plan, determined on a new survey, avoiding as much as possible the estates and towns of their opponents. And what was the result? Not twenty years had passed away, before railroads had so largely increased the value of all

property in their vicinity, that those very landholders would gladly have given twice the amount they had spent in opposing the Bill, to bring the railway near their estates; whilst the towns were actually obliged to construct railways at their own expense, or else to forfeit all hopes of being able to compete with the flood tide of commercial prosperity which poured in upon those places whose communities had been more clear-sighted than themselves.

"In spite, however, of their change of plan, the London and Birmingham Company found their difficulties but little lessened, and had it not been for the indomitable energy of Mr. Robert Stephenson, who had been appointed their engineer, it is possible they might never have carried their point at all. Twenty times did Mr. Robert Stephenson walk over the whole ground between London and Birmingham, to ascertain the exact direction the line should take; and all the time carrying out his survey under circumstances which, if they had not been so vexatious, would have been laughably absurd. He and his companions had to watch their opportunities for taking levels, &c., just as if they had been a gang of thieves, instead of a company of the most highly educated and scientific men in England. Now they watched a proprietor off his

estate, and then dodged round to the necessary point; now they waited till the evening had closed in, and then by the aid of dark lanterns made a rapid midnight raid across the property. Clergymen preached against them; magistrates denounced them; game-keepers and bailiffs tried in vain to capture them. They bore a charmed life, and in spite of all that could be done to prevent it, the survey was made, and the estimates of expense calculated, and in the session of 1832 a Bill was brought into Parliament praying for leave to construct the railway.

"Mr. Stephenson had brought the Bill to the House of Commons, but there unfortunately he was obliged to leave it, and the directors of the railway soon saw they could not carry their measure without bribing their opponents. It was a great shame, but there was no help for it; and the system of compensation thus introduced, led subsequently to the most grievous and dishonest extortion. In this instance it cost the company 750,000*l.* to buy up land whose value was really about 250,000*l.* This compromise, such as it was, being at last effected, the railway was commenced, and all went on smoothly enough until the works approached a high ridge of land near Rugby, through which it had been found necessary to tunnel. The experiments

requisite for testing the nature of the soil had been carefully made, and although, in the then infancy of railroad engineering, so long a tunnel as that which was now to be formed was known to be a very arduous undertaking, yet as no one expected to meet with any insuperable difficulties, a contract was readily enough taken by a certain man, to get it done by a given time, and at a given price."

"Oh, but, mamma, I thought you said Mr. Stephenson was making the railway; why did not he do it himself?"

"He was engaged in the general superintendence of the whole line, my love; but the work would not have gone on sufficiently quickly, if it could only have been continued just where he himself was overlooking. His plan was, to give out different portions of the line to different contractors, who each superintended a gang of navvies of their own; each working on till he met his neighbour's allotment; and, of course, the construction of the whole line was thus wonderfully expedited, whilst Mr. Robert Stephenson was at liberty to go up and down the line, just exactly as he pleased, and see that his directions were being carefully and accurately followed. But although he himself had superintended the boring of the Kilsby tunnel, he was quite as unprepared as

the unfortunate contractor, to find that a short time after the works were in full progress, the men came suddenly on an immense quicksand, which threatened to put an entire stop to the undertaking. Here was a blow; what was to be done now? The tunnel was flooded; the water seemed inexhaustible; the more they pumped, the more they might pump. Mr. Robert Stephenson was summoned hastily to the rescue. Engines were constructed and set to work incessantly; wells were sunk; springs were drained; but still on, on, on flowed the water, apparently as inexhaustible as ever. The directors looked grave. That terrible quicksand had already engulphed thousands of pounds, and who might say how many thousands more might not follow, and yet the sacrifice be all in vain? A general meeting of the directors was called. It was very unfortunate; most provoking; but there was but one course left, they said; the works must be abandoned, and the tunnel left to its fate."

"Oh, mamma," exclaimed Arthur eagerly, "I am sure Mr. Robert Stephenson will never consent. He will remember the mine at Killingworth years ago; and Chat Moss, mamma, he will surely remember that."

"Yes," added Ernest, "and I am very much mis-

taken if he does not tell the directors, that he is quite of their opinion that there is only one course left; but that that is to persevere."

Mrs. Grenville smiled, as she continued, "You have formed a very right estimate of his character. He begged and entreated the directors not to come to so hasty a decision. If they would only give him time, he felt certain of ultimate success. He asked but for one fortnight more; if, at the expiration of that period, he had not made such progress as would justify him in continuing the works, then he promised to abandon them, however much he himself might regret it, and to submit implicitly to the decision of the directors. His hopeful tone inspired them with new confidence. Besides, when had either Stephenson ever pledged himself to accomplish any work, and been found wanting in the performance? If he still thought it possible to drain the quicksand, by all means let him go on; they were ready to provide him with every assistance he might require. Thus armed with new powers, Stephenson set to work, if possible, with greater energy than before. Now improving the engines already at work; now inventing new ones to meet fresh difficulties as they arose; 1250 men, 200 horses, and thirteen engines, worked so heartily in the cause, that at the

expiration of the allotted time of trial, the water in the tunnel had so perceptibly decreased, that the directors were fully convinced that Mr. Robert Stephenson was right, and with their cordial permission the work was carried on, and at the end of eight months brought happily to an end. It will give you some notion of the magnitude of the undertaking, when I tell you that during the whole of that time 1800 gallons of water had been raised every minute, and conducted away to other and safe channels of escape."

"There, Arthur, there is a sum after your very heart," exclaimed Charles, laughing. "Now tell us, how many gallons were pumped up altogether?"

"I cannot tell you all in a moment," replied Arthur gravely.

"I should think not indeed," replied Mrs. Grenville, amused at his matter-of-fact way of answering Charles's question. "I do not suppose any one living, but Mr. Bidder, could answer such a question off-hand."

"Mr. Bidder; who is he, Aunt Helen?" inquired Charles.

"The most extraordinary calculator who has perhaps ever existed. He was a great friend of Mr. Stephenson's, and quite as wonderful a man as himself, though in a different way."

"Oh, mamma, do tell us about him then," said Arthur.

"I cannot just at this moment, it would take us too far away from Mr. Stephenson, whom we have rather deserted, I think, whilst we have been following the adventures of his son. But it is so very difficult to speak of the one without alluding to the other; their interests were so entirely in common; they worked so heartily together; the success of the one was so essential to the happiness of the other, that I can hardly give you a clear idea of what were the pursuits and pleasures of Mr. Stephenson's later life, without constantly alluding to his son, whose increasing fame and prosperity were so closely connected with his own. Finding how perfectly well able Mr. Robert Stephenson was to cope with difficulties, even such as those which had met him in the construction of the Kilsby tunnel, Mr. Stephenson thought himself quite at liberty to devote his own more immediate attention to the formation of the new railways which were now required in the North, his native country. The friends and associates of his own early days had greater charms for him than the more refined and luxurious people of the South, and he was at all times glad to go back again to his old haunts, rejoicing in being made instrumental in pro-

moting the prosperity, and opening up the resources, of that northern land which he loved so dearly.

"It was fortunate for him that his naturally fine constitution had been strengthened by the athletic pursuits he had been so fond of when a young man, and by the habits of self-denial and temperance he had then so steadily practised; his health could never otherwise have borne up against the accumulation of work he was now called upon to perform. It was not only that his opinion was sought for by the most scientific men in England and on the Continent, in all matters connected with railroads or engineering, and this of itself would have involved almost more labour than any one man could have accomplished; but, besides all this, he was incessantly at work, taking surveys, making levels, drawing plans, and superintending the actual formation of the different lines committed to his care, taking what little sleep he allowed himself whilst he travelled from place to place. His secretaries and clerks were in despair; how was it possible to keep pace with a man whose body never wanted rest, and whose brain never tired?

"It will give you some idea of his extraordinary powers of endurance, when I tell you that Mr. Smiles says, that during three years when Mr. Stephenson was

very busily employed in constructing different lines, in addition to all the head-work that was incessantly required of him, he actually travelled in his carriage over more than twenty thousand miles of country, whilst superintending the progress of the different works. Whatever he had undertaken to do, that he liked to see done under his own eye.

"He did not care what fatigue or trouble he himself endured, but then he expected every body to be as active and energetic as he was himself, and this occasionally led to disappointment; he used to say, 'he found it an easy thing to engineer matter, the difficulty was to engineer men.' This very likely was the truth, but then, I think, he was a little too apt to forget that though he could find plenty of helpers, it was somewhat more difficult to meet with a succession of Stephensons.

"No one, however, was more prompt than himself to recognize merit in another, and wherever he saw intelligence, and energy, and perseverance, qualities which he valued far above what is generally called genius, he always used his utmost endeavours to bring their possessor into notice; or, to use his own words, 'to make a man of him.' And many a story is told of the assistance thus rendered to those in the humbler spheres of life, and who were enabled by his means, not only to

achieve fame and fortune for themselves, but to become useful and valuable members of society. I was once talking on this subject to a very intimate friend of Mr. Stephenson's. 'Yes,' he said, 'it is perfectly true, he was always ready to help whenever he met with a man of good abilities united to modesty and diffidence of manner, but any thing of foppery, or presumption, or ignorance was intolerable to Mr. Stephenson. He saw through it in a moment, and woe betide the unfortunate offender. If, indeed, the man was perfectly wrapped up in his self-esteem, he would leave him to the enjoyment of his ignorance; but if he thought he saw a hope of stirring him up to better things, the pretender would suddenly find himself pulled up in the middle of some presumptuous statement, by a calm, commanding "Sir, you know nothing whatever of what you are saying." And he would be a bold man indeed, who, once exposed to such a rebuke from George Stephenson, would run the risk of undergoing the ordeal a second time.'

"The love of truth was one of his most distinguishing characteristics. He detected in a moment the slightest deviation from strict accuracy, and instantly exposed it. On one occasion when travelling he happened to pass by a field in which some remarkably fine

cattle were grazing. Fond as he was of all animals they instantly attracted his attention, but he did not happen to know of what breed they were.

"'Do you know?' he said, turning to the gentleman who was travelling with him.

"His companion knew no more than himself, but not liking to confess his ignorance, he instantly hazarded a guess.

"Stephenson saw the state of the case in a moment, and turning round instantly, he looked him steadily in the face, saying, good-humouredly but firmly, 'You are only guessing, why could you not say at once that you know nothing whatever about the matter?'

"And it was not only when he was in the society of his equals that he was thus decided and uncompromising. Truth was his object, and it was no matter what was the station, or the fame, or the talents of a man who advanced what he thought to be a fallacy. Without an instant's hesitation he exposed it, whether the man was a peer or a peasant. One curious story is told illustrating this point. At a great meeting held at the opening of a railway which Mr. Stephenson had constructed, one of the most celebrated men in England proposed the engineer's health in a speech as remarkable

for its varied information, as for the graceful tribute it paid to Mr. Stephenson's talent and success. Unfortunately in referring to the line just opened, the speaker compared the work to one of those gigantic undertakings, begun and carried on so successfully by the Roman conquerors of England; works which for hundreds of years have excited the admiration of all succeeding generations.

"As he listened, Mr. Stephenson became evidently fidgety and impatient, and no sooner was the speech concluded, than apparently quite unheeding the graceful tribute of praise to himself, with which it had ended, he sprang up, and turning to the orator, commenced his reply with those well-known and often much-dreaded words, 'You know nothing whatever about it;' and then he proceeded to point out why the construction of the great old Roman roads could not conscientiously be compared to railway engineering. The Romans carried their roads straight to a point, true enough, but in doing so how different was their course. They went over the highest hills, it was necessary that they should do so, they wanted to look after their enemies; they went into secluded dales, they must pitch their camps, and no one knew better than they where to find the right spot. 'Now,' he continued, 'that is not our plan; we do

not want to go to the top of hills, we have got no enemies to look after; we do not carry our lines into secluded dales; we want the great cities and commercial towns, and we choose the levels that will take us soonest and quickest to where we want to be.'"

"Oh, aunt!" interrupted Charles laughingly, "how astounded the unfortunate gentleman must have been at such a reply. And when he flattered himself he had made such a telling speech, and rounded off his periods so splendidly."

"Fortunately for Mr. Stephenson," replied Mrs. Grenville, "he was a man who could thoroughly appreciate the sterling worth of the great engineer, and I have no doubt that he was far more charmed with his straightforward and manly statement, than he would have been with the most graceful acknowledgment of thanks to himself. But I told you the story to show you how Mr. Stephenson loved truth for the truth's sake, quite irrespective of the prejudices of any society in which he might find himself. Occasionally, however, this very strictness, admirable though it was, deprived him of some enjoyments. He could not appreciate the charms of imagination; every thing that gave him pleasure must be real, practical, solid. He

could not understand that any rational being should derive amusement from any thing that was fictitious.

"On one occasion he had been persuaded by a very intimate friend to go with him to the theatre. For some little while Mr. Stephenson sat looking at the actors with a puzzled, distressed expression of countenance, at length touching his friend's arm, he said abruptly, 'Come away, George, come away, I cannot stay longer, it is all lies.'

"With such a character as this, it is no wonder that in later life he set himself strongly in opposition to the mad spirit of speculation which led to the construction of railroads by means calculated to entail ruin on hundreds of those concerned in them. People are slow to believe that they may have too much of a good thing. Railroads and the locomotives had wrought such wonders, that it became a very general impression that nothing was impossible to them, and that the powers of the engine might be developed *ad infinitum*. Because some of the great railways had succeeded so triumphantly, persons argued, it followed that there could be no such advantageous investment for money as in railway shares. There were plenty of acute, clever, unprincipled men ready to take advantage of the popular delusion; railways

were projected to towns and places where it was quite impossible, from the very nature of the country, that there could be any traffic which would hold out any reasonable hope of a profitable return for the capital to be expended. The most fascinating prospectuses were issued; the more alluring, the less were they true. The shares were eagerly bought up; rogues prospered and grew rich, the simple and honest were duped and ruined. Against all such malpractices Mr. Stephenson steadily set his face; if he was asked to take the superintendence of any new line, his first care was to ascertain whether it was really wanted, and whether when it was made there was any reasonable hope of its remunerating the shareholders. If he thought that this was not the case, nothing would induce him to have any thing to do with it. In the same manner when he was requested to make the estimates for a new line, he invariably did so at what, to the best of his judgment, appeared to him the amount which the construction of the railroad would cost. These estimates were consequently frequently very much larger than those which the original proposers of the line had led the unwary shareholders to expect; and they would do their best to make Mr. Stephenson reconsider his calculations, urging the impolicy of raising so large a sum at the outset. But Mr. Stephenson held, that

'honesty at all times was the best policy; he felt certain that the works could not be well executed for a sum less than the one he had named. If they did not like it,' he said, 'they could seek an engineer elsewhere; he would be no party to a fraud by which he was to be benefited, and the company ruined. He could not prevent other men being rogues, but at least the taint of dishonourable conduct should never attach to his own name.'

"It was the same honourable, truthful spirit that made Mr. Stephenson oppose all the wild speculations that were now being broached about the possibility of employing atmospheric pressure as a substitute for locomotives; by which instrumentality we were to fly through the air as readily as birds, and be propelled over the ground with a rapidity hitherto unknown. When our own South Devon line was projected, Mr. Stephenson said from the first it would not do; it was a very pretty, ingenious toy, but for a great working line of road, a medium of traffic, it was wholly unfitted; it was too costly in its mechanism. Unfortunately, people thought that his advice was only dictated by his jealousy for the well-being of his own beloved locomotive; they told him so, adding, 'Why the Council of the Institute of Civil Engineers has pronounced in

favour of this new atmospheric line; they must be right.'

"'It won't do,' was Mr. Stephenson's quiet rejoinder; 'it will never pay.'

"A very few years passed away before the unfortunate shareholders of the South Devon line had cause to repent deeply that they had not listened to the words of the shrewd, straightforward engineer, when he had sought to warn them from embarking in an enterprise which could only end in disappointment. The atmospheric tubes half ruined the company, and then they were removed, and the locomotives substituted in their place; but even to this day we rue the experiment; for the peculiar construction of the line, the gradients being so much steeper than in those built originally for the use of the locomotives, is the cause of the constant delays and stoppages which make our South Devon branch a very by-word amongst railways; and often when I have been to fetch papa from the station I have been very painfully reminded of Mr. Stephenson's prophecy, 'It won't do; wait a little, and you will see that I am right.' I have waited so long and so often that I at least am perfectly convinced of the fact.

"But, perhaps, one of the most curious positions in which Mr. Stephenson was placed by the wild specula-

tions of others, was when he found himself called upon to check their daring assertions that there was no limit to the speed which the locomotive might attain. That might be all very true, he himself had told them so long ago, and had been laughed at as a fool and a madman for so saying. But though an engine might be constructed with such powers, it did not follow that good judgment or sound sense would approve of their being brought into daily use. This could serve no purpose but to add greatly to the expense of working the line from the increased wear and tear, and to court the presence of that very danger which did not exist as long as people would act by the dictates of common prudence. Forty miles an hour was surely fast enough for those who had once laughed at the idea of travelling twelve; this was a safe pace, and a remunerative pace; and both these points ought to be thought of and secured; the one for the sake of the passengers, and the other for the sake of the company itself, and to neglect the interests of either merely for the sake of astonishing the world, and performing what was thought to be an impossibility, was in his opinion neither honest nor honourable. In spite, however, of all that he could say on the subject, the rivalry then existing between the principal engineers, supported on the part of the public, by a sort of craving for the perpetual

excitement of ever-increasing speed, prevented Mr. Stephenson's wise counsel from being listened to with the deference it deserved. Even Mr. Robert Stephenson was carried away with the general enthusiasm; he could not endure the thought that any one's engines were to surpass his own; if others increased their speed and power, he must perforce do likewise. The consequence was that in 1845 he turned out of the Newcastle manufactory an engine, which travelled forty-five miles in forty-seven minutes. They have attained to even a greater speed since then; but at that time it seemed stupendous, and, however much Mr. Stephenson might have condemned the practice in theory, I have no doubt that in his heart he rejoiced at this new achievement of his son."

"Aunt Helen," exclaimed Charles, "do you remember the last time we went up to London?"

"Yes, perfectly."

"Did not we go a glorious pace from Didcot, making up for lost time? Why, we must have gone sixty miles an hour then."

"I should think we did for a short distance."

"Oh! I remember, it was such fun, how I did like it, only I wanted to go just twice as fast; and that lady, aunt, who sat in the corner and shrieked, and made

such a fool of herself; oh, it was famous!" and Charles laughed heartily at the bare recollection of his enjoyment.

"You seem to forget what was sport to you was pain to another," replied Mrs. Grenville.

"But then, Aunt Helen, it was so foolish of her."

"All have not your high health and spirits, my dear boy."

Oh! Aunt Helen, what would you have said if we had screamed?"

"I should have been very annoyed, from this very reason, that you would have had no excuse whatever for such absurd conduct. But look, whilst we have been so busily engaged with Mr. Stephenson and his plans we have quite forgotten the weather, and I think it is really clearing up now; the sun seems to me to be trying to break through the clouds; I hardly think that it rains at all; run to the window and see."

The boys were glad enough to comply with this request, and joyfully announced there was no doubt that the weather was gradually taking up. "The wind has quite gone round, mamma," exclaimed Ernest.

"And there is a large patch of blue sky," added Charles; "real blue sky this time, Aunt Helen, and no effect of my imagination. And there is not one drop of

rain; and look, there is Donny running across the lawn, that is the best sign of all; he hates the wet so, nothing ever induces him to go out in the rain. May we run and order the ponies, Aunt Helen?"

Hardly waiting for the permission to be given, off scampered the boys to get ready for their ride, losing so little time upon the road, that Charles afterwards declared that the pace at which they put their ponies was only to be equalled by Mr. Stephenson's express engine. On their arrival at Helmstead, they found to their great delight that Danvers was so far recovered as to be allowed to see them; and his pleasure at the meeting was only to be equalled by their own. Indeed, so mutually were they pleased with each other, that when the boys said good bye to their new friend, it was with the understanding that their visit was to be speedily repeated, and a very cordial desire on both sides to cultivate a closer intimacy.

CHAPTER X.

Mr. George Stephenson in old age; honoured; beloved—His death—Conclusion.

"MAMMA, there is only one reason," said Arthur, "why I do not like Biography, it always ends so sadly."

"Ends sadly," exclaimed Ernest; "what do you mean, Arthur?"

"Why, just when you get so fond of a person, and so interested in all they are doing, then it all comes to an end, and they die, and you feel just as unhappy as if you had lost a friend."

"I used to have the same feeling very strongly when I was young," replied Mrs. Grenville, "but I do not think it is a right one; for supposing that those in whose earthly career we have been deeply interested have employed their talents to God's glory, and for the good of their fellow-creatures, we ought not to feel that they are lost to us, simply that they are removed to another and a wider sphere of happiness and usefulness, where

we may ourselves look forward to joining in their work. It has often struck me that it may be one source of our happiness in heaven to know that our example whilst on earth has drawn others to righteousness and to God. If so, the sadness of which you complain, Arthur, would at once lose all its sting."

"But then, mamma, I am so sorry that they are gone from amongst us. I always long so to have known them myself."

"That is rather a selfish sorrow, is it not, my love?"

"Well! perhaps it is, mamma."

"But, Arthur," said Charles, "what put this into your head just now?"

"I was thinking of Mr. Stephenson, and how sorry I should be when mamma came to his death. I know it cannot be very far off, for mamma has told us what happened in 1845, and as he has been dead some years, he could not have lived very long after that."

"He died in 1848," replied Mrs. Grenville.

"But you have got something more you can tell us about him, mamma, have you not?" inquired Ernest.

"I am afraid there is not very much more to tell," replied Mrs. Grenville. "Prosperity is always more or less monotonous; and Mr. Stephenson's time and thoughts in later life became so absorbed with attending

to the various details of his profession, that one day was very like another; and I do not suppose that you would care to hear of all the disputes and squabbles in which he was perpetually involved, first with one set of parliamentary agents, and then with another, in carrying through the different railway Bills for the lines of which he was appointed engineer. From about 1840, however, Mr. Stephenson gradually withdrew from the worries of business. He needed rest, and determined to spend the remainder of his life in the enjoyment of those country pursuits, which had been so dear to him even from his childhood. He was always, however, ready and delighted to give his advice whenever it was needed; and not only in England, but on the Continent it was eagerly sought whenever any new line was projected, or any unforeseen difficulty was to be overcome. Amongst those who thus asked his assistance was the King of the Belgians, and at his Majesty's invitation Mr. Stephenson went over to Belgium in 1837, to give his opinion on the railroads projected in that country. He repeated his visit in 1845, when his opinion was again asked on a new line about to be formed through the forest of Ardennes into the French territory. Mr. Stephenson undertook to survey the ground, and entered on the undertaking with as much energy as if he had been still

quite a young man; going over the whole line himself, making his own observations, and charming the peasantry of Belgium with the cordiality and genial kindliness of his manner, just as years before he had won the hearts of his own sturdy Northumbrian countrymen.

"To Mr. Stephenson, the weeks which he spent in surveying this new line were weeks of real enjoyment. He liked the novelty of every thing around him, and thoroughly enjoyed being able to study at his leisure the aspect of a country entirely new to him, and to amuse himself with the peculiarities of its population. On his return to Brussels, he found an invitation awaiting him to a grand banquet to be given in his honour by all the principal engineers in that part of the Continent, who were anxious to take this opportunity of showing the respect and admiration in which they held both his talents and his character. This was most gratifying to Mr. Stephenson, but a still greater pleasure was in store for him. Hardly was he placed at the head of the elegantly arranged table, round which were seated some of the most distinguished men of Europe, amongst whom he proudly recognized his son, than his eye was caught by a model in the centre of the table. He looked: could it be? again he looked, this time more intently. Yes; there could be

no doubt about it, and he exclaimed in joyful surprise to a friend who was sitting by him, 'Look, look, P——, there is the "Rocket!"' And so it was: placed upon a raised pedestal, with a wreath of laurel suspended over it, stood a beautiful and perfect model of the engine which years before had won for Mr. Stephenson his present fame and fortune."

"Oh! I am so glad!" exclaimed Arthur. "How delighted Mr. Stephenson must have been; and that was the engine that was thought nothing of in England."

"Yes; I am afraid we often sacrifice the courtesies of life," replied Mrs. Grenville, "to our love of practical money-making. We might take a few lessons with advantage on this subject from our continental neighbours. They understand the amenities of life far better than we do; we are so apt to think that they are beneath the notice of a grand, hard-working, energetic people like ourselves, that we talk of them as if they were something degrading, all very well for women and fools, but quite unworthy the attention of earnest, intellectual men. But this seems to me a great mistake; nothing that softens the heart, calls forth the affections, or adds to the happiness of mankind, ought to be considered as below the regard of those who bear the name of Him, who beyond all who have ever lived sympathized

with the lowliest as well as inspired the noblest affections of which our nature is capable. And, besides, to take a much lower ground, by neglecting these trifling courtesies we throw away numberless opportunities of giving pleasure, and of brightening up the path of life; and surely we are not justified in doing this, when a trifling exertion of thought, or a few kind words, are all-sufficient to attain the object. The Belgian engineers, at any rate, were wholly successful in their purpose, for Mr. Stephenson used often afterwards to say, that he never remembered a pleasanter or a prouder moment in his life, than when in the midst of the banqueting hall in Brussels he suddenly espied the model of his own triumphant locomotive."

"What a change, mamma," said Ernest, "since the days when as a child he made his clay models at Callerton."

"Yes; but remember, it was the same character which then enabled him to continue, week by week, working out every new idea that occurred to him, never disheartened by failure, never elated by success, which now placed him amongst the most distinguished men of Europe, and gave him that place as his own undisputed right. But prosperity could not spoil George Stephenson; his love of truth would have made him

despise himself, had he pretended to be other than exactly what he was. In a palace, as in a cottage, he was still himself, the simple, unaffected man of genius. But though his natural self-respect made him equally at ease whether in the presence of royalty, or amongst the miners, companions of his early days, yet when he could choose he preferred the society of his equals to that of persons very much raised above him in rank; and it was not until Sir Robert Peel had repeatedly requested him to pay him a visit, that he could be prevailed upon to stay even at a house where he was sure of being received with marked distinction, and where he would meet with those who would be congenial to him in tastes and pursuits.

"At length, however, on Sir Robert telling him he had invited a party expressly to meet him, Mr. Stephenson was induced to promise that he would make one of the guests at Tamworth. Mr. Smiles tells an amusing story of what took place during this visit. I have heard the same anecdote from Mr. Robert Stephenson myself, and it is one curiously characteristic of his father. From the want of an early classical education, Mr. Stephenson had not the power of expressing his ideas, which is generally to be found in men of his great ability, especially if they have had

the advantages of a university training. What Mr. Robert Stephenson once said to me, in speaking of his father, must have been strictly true: 'He had an instinctive perception of truth; bright flashes of genius. He saw the whole bearing of a subject in a moment; he could not indeed reason it out, fill in the interstices, but he grasped truth instinctively in its native simplicity. His words were like a bright flash of lightning illuminating a dark night; for a moment the whole landscape was before you and you caught every lineament.' Great, however, as this power unquestionably was, yet his want of facility in expressing his ideas placed Mr. Stephenson in an unfair position, when he was brought in contact with men accustomed from their earliest days to clothe their thoughts in fluent and appropriate language. It was not every one whose mind was quick enough to take in the detail of the landscape during the moment it was lit up by Mr. Stephenson's flashes of genius, and the great engineer often regretted bitterly that he was silenced by those whom he felt to be not only inaccurate in their statements, but inferior to himself in understanding.

"It chanced that during his visit at Tamworth the conversation turned on some subject on which he and Dr. Buckland, the celebrated Dean of Westminster, took

different views. The matter was eagerly discussed; Stephenson was quite certain he was right, but he could not find the words in which to define precisely what he knew to be the truth. The Dean, a perfect master of the English language, charmed the party by his eloquent and lucid explanation. Stephenson was silenced, not convinced; he pondered over the subject all the evening, he thought of it as he lay awake at night, and early in the morning he was up and out to try whether in the pure, fresh air he could find words to express the truths so clearly grasped by his own understanding. As he was walking up and down the lawn, with the puzzled, anxious look peculiar to him when his brain was working out any difficult problem, he was accosted by Sir William Follett, one of the most brilliant speakers we have ever had at the English bar.

"'Why, Stephenson, what is the matter? You seem to be absorbed with no very pleasant calculations.'

"'I am thinking over that discussion with the Dean last night,' replied Mr. Stephenson.

"'Well, what of it?'

"'I was right, and he was wrong,' answered Stephenson; 'only I could not tell them why it was so.'

"'Are you sure of that?' asked Sir William.

"'Certain,' was the unflinching reply.

"'Then state your case to me, make me master of your facts, and trust me to argue the matter for you.'

"Mr. Stephenson was only too glad to close with such an offer; and Follett with that rare discrimination which distinguished him from all other advocates grasped Mr. Stephenson's meaning at once, seizing instantly on the leading points, and making himself master of the whole subject.

"That evening, after dinner, Sir Robert, at the instigation of Sir William Follett, led the subject of conversation back to the discussion of the previous day. The Dean, naturally enough, adhered to the opinions he had originally expressed. Sir William espoused the opposite side, Mr. Stephenson, meanwhile, remaining perfectly silent, listening with intense interest to the ably advanced argument of the brilliant orator. It was as if a new power were suddenly placed within his reach. Ideas which had been lying deep in his own mind, but which he had been utterly unable to bring forth, were suddenly displayed, clear, sharp, sparkling truths; facts were made available, proofs were rendered incontrovertible. The tables were turned, and the victor of yesterday was the vanquished of to-day.

"'Well,' exclaimed Mr. Stephenson laughingly, as

the Dean withdrew from the unequal contest, 'of all gifts ever bestowed upon man, there is nothing, in my opinion, that equals the gift of the gab.'

"But although when mixing in conversation with men of very cultivated minds, Mr. Stephenson might, to a certain degree, be made to feel the disadvantages under which he laboured from the want of early education, yet, whenever it was a mere matter of business, his love of truth, his vigorous understanding, and his clear perception of the merits of the case compensated for the want of mere mental training. In the constant legal examinations to which he was exposed he was an invaluable witness for his own side; no casuistry puzzled him, no brow-beating daunted him. Clear-sighted and perfectly self-possessed, he gave his evidence straight to the point, though occasionally in language a little more vigorous than is usually heard in our courts of law.

"On one particular occasion, it was life or death to the opposing party to be able to upset Mr. Stephenson's evidence. If any one could have accomplished this, it would have been Alderson, the counsel employed against him, and I have no doubt that Alderson went into court willing enough to carry out the directions of his clients; but it would not do. There was that about George Stephenson which could not be beaten down,

and still less could he be cajoled and flattered. Alderson failed in his purpose, but he did full justice to the character of the man who had foiled him; and afterwards in speaking of his many noble qualities, he added, with that readiness of illustration for which he himself was celebrated, 'Yes, Stephenson's manner may be rough, it is but the scoriæ; all below the surface is true metal.'

"It is not surprising that Mr. Stephenson's advice and assistance should have been eagerly sought for on all sides, but as years passed on he became anxious to withdraw from the troubles and anxieties of his arduous profession. He had set the mighty engine in motion, astounding was the impetus it had in so short a time attained, and although Mr. Stephenson's vigorous grasp might still have retained its hold, yet the effort was too fatiguing, he needed rest. He could leave all his great works safely in the hands of his son, and rejoicing in Robert's daily increasing fame, retire himself to Tapton, an estate which he rented in Derbyshire, and give himself up entirely to the pleasures of a country life. Again, as when a boy, he went birds'-nesting, again he sought the hedges and hunted the woods for the loveliest flowers of spring and the last bright berries of autumn. Again, he roamed for hours together over the hill-sides,

rejoicing in the pure air and his recovered freedom. His wealth enabling him to carry out all the plans which had been the day-dreams of his boyhood, his rabbits, his chickens, his dogs, his horses became the pets of his later life, and there is no end to the stories he used to tell of their love for him, and the wonderful things which he could make them do. One black horse was an especial favourite, and this animal, not particularly tractable with any one else, would follow Mr. Stephenson about like a dog, and go and come, and do every thing at his bidding.

"Then, too, his gardens were something wonderful in the marvellous contrivances they exhibited for bringing fruits and flowers to perfection. Neither time nor expense was grudged in producing the most perfect specimens that art and skill could exhibit. His pines were the wonder of the country round. By means of hot-water pipes which generated steam, Mr. Stephenson had contrived to create a fictitious atmosphere, very like the oppressive climate of the tropics; concluding that if he wished to bring the fruit to perfection, he must provide the means which nature herself pointed out were necessary. The end fully answered his expectations. Both in size, colour, and flavour his pines were unrivalled.

"But though he thus rejoiced in being surrounded by

every thing rare and costly, it was from no love of ostentation; it was simply his genuine devotion to science, and his desire of seeing every thing that was beautiful in nature cultivated to the extent of its capabilities. For himself, his tastes were as simple and inexpensive as in the days when he could enjoy the dinner Spot brought him to the pit. He might like and be thankful for the good things that surrounded him, but they made no real portion of his daily enjoyment, and he was just as contented with the humblest fare or the poorest accommodation as with a princely feast and a bed of down.

"Another of the great interests of the last years of his life was in superintending the formation of the Clay Cross coal-pits. They were in the immediate neighbourhood of Tapton, and he rented all the surrounding ground that they might be under his own immediate care and supervision. Endless were the ingenious contrivances which he delighted to invent for decreasing the labour of the miners, and facilitating the excavation and raising of the coals; and he would watch their operation and success with a delight as fresh as that which he could have felt in his young and vigorous manhood. Indeed this was one of Mr. Stephenson's most remarkable characteristics. The sense of power

never seemed to leave him; it pervaded every thing he said and did. He was a strong man glorying in his strength, yet with an overflowing kindliness of nature, which made him tender to all things living which needed his care. An action that he thought unfair or wrong was intolerable to him. It did not signify whether it was done to himself or to others. It was the act itself which gave him displeasure. On one occasion he was going on a journey; railroads were not then so plentiful as they are now, and he was travelling by coach. The box-seat had been taken by a gentleman, and Mr. Stephenson had, therefore, secured the one immediately behind. For some cause the gentleman had got down from the box, leaving his coat to secure his seat. Before he returned, a young and fashionably dressed man lounged out of the hotel before which the coach was standing, and coolly removing the gentleman's coat, appropriated the box-seat for himself. In a short time the owner returned and claimed his own.

"'I have taken my place,' was the only reply, uttered in the tone of a man who thought himself quite above entering into any argument on the subject.

"'But, sir,' rejoined the other, 'that place was mine already.'

"'If you wished for it, you should have kept it better.'

"Hitherto Mr. Stephenson had been a silent observer of the scene; but finding that the gentleman, anxious to avoid an unpleasant altercation, was likely to cede his right, he said with the cool tone of authority he knew so well how to assume, 'Young man, you would not have said that to me.'

"'Indeed, you think not,' was the supercilious reply, 'I rather think I should.'

"'And if you had,' returned Mr. Stephenson, 'I should just have pitched you into the middle of the road there; and what is more, if you do not get down from that seat at once I will do it now.'

"The intruder turned round to see who ventured thus to address him; but there must have been something in his monitor's look that showed he was not a man to be trifled with. Discretion was, evidently in this case, the better part of valour, the young upstart made a precipitate retreat, and with many thanks to his vigorous champion the rightful owner remounted the box."

"What a plucky fellow he was," exclaimed Charles laughing; "how I should have liked to have known him, Aunt Helen."

"Ah! any one might well wish to have been his friend," replied Mrs. Grenville. "Such men, I am afraid, are fast dying out amongst us. The refinements of conventional life are sadly injurious to the development of great and original genius. They bring us all too much to a level of mediocrity. However it is great occasions that call forth great men, and we must not expect that we are all to possess the vigour and power of George Stephenson. We ought, perhaps, rather to be satisfied that so large a portion of the father's genius has descended to the son, and that England may still command his services."

"How Mr. Stephenson must have delighted in his son's success, mamma," said Arthur; "when he remembered all his care of him when he was a little boy, and all that he had given up that Robert might be well educated, what a pleasure it must have been to see him such a great, good man."

"It must, indeed, have been an unspeakable happiness, and I feel quite thankful that I have been permitted to witness such pure, unselfish love as that of Mr. Robert Stephenson for his father. It is quite refreshing to feel that it can exist amidst the jarring interests of this cold, selfish world. I remember, how struck I was years ago by Mr. Robert Stephenson's evident vexation at some

remark, which by doing justice to one of his own great works, seemed to place his genius on a level with his father's."

"'Those who say so,' he exclaimed, 'do not know my father. Do not talk of my mind by comparison with his. His was one of gigantic grasp; equal in power to Watt. My only object through life has been to add to my father's fame; and the only honour that I ask for is, that my name may go down to posterity with that of George Stephenson.'

"He need not fear but that the wish will be gratified, and to my mind no coronet would add nobility to the title. With the strong love which bound them to each other, it is no wonder that some of the happiest days of Mr. Stephenson's later life were spent in his son's house in London. It was during one of these visits that a circumstance occurred, curiously illustrative of Mr. Stephenson's courage and presence of mind.

"One night, after the family had retired to rest, Mr. Robert Stephenson was suddenly roused from his sleep by the sound of crashing glass. Hastily rising, he saw that the windows of his room had been burst in by the heat of flames, which were now running quickly up the wood-work. To be up and down, and to awake

the household, was the work of a few minutes; and in a state of curious dishabille and very great alarm the various members of the family met in the hall. 'Are we all here?' was Mr. Robert Stephenson's first inquiry. Various names answered to their call, but there was one well-known voice which was not heard.

"'My father is not here! Where is my father?' exclaimed Mr. Robert Stephenson.

"At this moment a door opened at the head of the stair-case, and Mr. Stephenson was seen calmly walking out of his bed-room, with his carpet-bag in his hand. He had got up at the first alarm, dressed himself, packed his bag, and now in the most leisurely way was preparing to join the party in the hall. The son trembled for his safety, for already the flames seemed as if they must have cut off his descent; but Mr. Stephenson had lost none of his nerve since the day he had descended into the Killingworth coal-pit: he calmly laid his hand on the banister, measuring the distance between the flames and himself, and then walked down the stairs with perfect composure, saying, as he placed his carpet-bag on the hall table, 'There, now I am ready to help others or be off myself.'

"It was this perfect self-possession which inspired every one with such extraordinary confidence in Mr.

Stephenson. All say alike, that you could not be with him, or hear him speak, without feeling the most implicit reliance on the innate power and rectitude of this wonderful man; and yet there was nothing painful in this sense of his superiority, tempered as it was by the kindliness of his nature, ready to enter into the pursuits and interests of those with whom he lived. No wonder that those who knew him well, loved him so devotedly. One who had ample opportunities of judging of the truth of what I have just said, once wrote to me: 'Those were, indeed, delightful evenings spent in his society. It was impossible to know him personally without being impressed with his rare combination of admirable qualities. Marvellous, indeed, it was to see and listen to him, and reflect on what his early life had been. The light of genius shone perpetually around him, bursting in startling flashes from his conversation, lending a beauty and refinement to his manly countenance, which the natural symmetry of his features would alone have failed to produce. His figure was erect and dignified, and the moment he entered a room, you felt at once you were in the presence of a man of genius.'

"No wonder that when such a man was suddenly withdrawn by death, a blank was felt in those social

circles, of which he had been the charm and delight, which those who mourned his loss were well aware could never be filled up again on earth."

"Did he die quite suddenly then, mamma?" exclaimed Arthur.

"Very unexpectedly to those about him, though it is possible that the seeds of disease had long been sown. In September, 1845, he had been requested to pay a visit to Spain, that he might give his opinion upon a railroad which was in contemplation between Madrid and the Bay of Biscay. Always fond of travelling, seeing new places, and studying the character of new people, Mr. Stephenson, although overwhelmed at the time by a multiplicity of occupations, unfortunately accepted the invitation; and in company with some intimate friends, started at once for the Continent, travelling through France that he might have the opportunity of seeing its southern provinces. He had but six weeks to accomplish every thing that he had undertaken to do, and on his arrival in Spain he found considerably more work awaiting him than he had been led to expect.

"To slur over his work was not in Mr. Stephenson's nature. As of old, he would see to every thing himself. This, combined with the fatigue of surveying such an impracticable line as that from Madrid to the coast,

was more than his strength could bear. He felt he was knocking up fast, but still with his indomitable energy he would persist in carrying out that which he had undertaken to do. It was in vain that his friends entreated him to moderate his labours. He had the work to do, and it must be done. The consequences which had been foreseen, only too surely followed; still, even then, if he would have consented to lie by for a time, it is possible that the mischief might have been averted; but he knew that his presence in England on a particular day was important to others as well as to himself, no persuasions, therefore, could induce him to delay his return. By a strong exercise of will he kept down the malady; but, alas! before he reached England, it was abundantly clear, that struggle against it as he would, he could no longer conceal from himself, or others, that he was alarmingly ill. Hardly had he gone on board the packet, which was to convey him from Havre to Southampton, when a violent accession of pleurisy set in. If it had not been for his still wonderful strength of constitution, combined with the skill and unceasing watchfulness of those who nursed him, he must have sunk under the violence of the disease. Happily his life was saved for the time, but although he thus apparently rallied, his

constitution had received a shock, from which it never afterwards fully recovered. Of this truth, however, he could not be himself persuaded. Never having been accustomed from his boyhood to any thing like restraint, the care which was now really necessary for the preservation of his health was intolerable to him."

"Ah! Aunt Helen," interrupted Charles laughingly, "he ought to have had a wife, ought he not? There is nothing like a wife for keeping a man in order."

"Unfortunately," replied Mrs. Grenville, "even that infallible prescription failed in Mr. Stephenson's case. He had been twice married since the death of Mr. Robert Stephenson's mother; and such care and affection as a wife could give him were happily his own. But I am afraid he was not a man who would permit himself to be kept in order, for his own good; he piqued himself upon his wonderful strength of constitution; he gloried in his power of bearing fatigue, and being able to perform feats of athleticism worthy of the young and vigorous days of his youth. It was not, therefore, surprising that he should not like to live by rule, and give up his habits of independence for the strict regimen necessary for an invalid. It was no use worrying him, he never could be made to think of himself; his friends could only look on anxiously and

watch the results. It so chanced that in the autumn of 1848 he was superintending an alteration in his conservatories at Tapton; excessively interested in the progress of the works, he used to go from hot-house to hot-house, without a thought of the danger to which he was exposing himself, by these sudden and violent changes of temperature. A sudden chill was the consequence, violent inflammation set in rapidly; he had not strength to bear up against the necessary remedies, and after a few days' illness, to the inexpressible grief of all who loved and honoured him, on the 12th of August, 1848, he quietly breathed his last.

"Nor was sorrow for his death confined to his own immediate circle of friends; England felt that she had lost one of her greatest men; and long will the recollection of his sterling worth be held in honour amongst her sons. Yes, so long as Englishmen estimate at their true value energy, opposition could not quell; perseverance, proof against all difficulties; clear, good, common sense, content to choose the happy medium; and. calm judgment, unswayed by vanity, unblinded by self-interest.

"High, however, as is the position which has been awarded with one consent to George Stephenson; deep as is our debt of gratitude to the man who by his

genius brought about the greatest social change the world has ever witnessed; still perhaps we hardly estimate aright the full value of what he has done for us. We have forgotten, so to speak, what was the state of English society before his days. We are so accustomed to the comforts and conveniences brought to our homes, through the agency of steam, that really we have ceased to think about them, and take them as a mere matter of course. Think, for instance, of the incalculable blessing of our post-office system; it is all very well to talk of the penny post, and of the immense advantages we derive from it, but where would have been the penny post without the locomotive? Mr. Rowland Hill might have planned in vain, had not his clever schemes been made practicable; thanks to the inventions of George and Robert Stephenson.

"In the days of the mail coaches, between four and five tons of letters were sent away daily to all parts of the kingdom from the General Post-office; on the 16th of May, 1856, Mr. Robert Stephenson ascertained, for a particular purpose, that the number sent by the mail train from the Euston Square Station alone amounted to one hundred tons. And that is two years ago, since then the increase of the post-office business has been immense.

"But this is only to mention one instance of the increased comforts of our daily life for which we are indebted to our great engineer. In so many ways the blessings brought about through his instrumentality, are indirect, though not the less real. With increased facility for travelling, inhabitants of the most distant countries are gradually becoming known to each other, and from this intercourse good must eventually ensue. Prejudices must be lessened, antipathies overcome, and so the way be smoothed for the more general reception of the Gospel truth, destined to be preached from pole to pole, that the religion of the Saviour can alone be productive of 'peace on earth, good will to man.'"

"Oh! mamma," said Arthur with a sigh, "I wish I could be as great a man as Mr. Stephenson."

"That, my love, is impossible; you have neither his talents nor his strength of constitution. Better wish for that which is more practicable, and seek for that to which you may attain; imitate Mr. Stephenson in his kindliness, his truthfulness, his self-denial, his perseverance, his readiness at all times to promote the good of others; follow him in these as closely as you will. You would be turning his example to very bad account, if it only made you discontented with your own talents and position. God has given to each his

allotted work, only let that be done in a right spirit, with earnestness of purpose and singleness of heart, and you may rest assured that your end will be attained, not possibly in this world's fame and applause, but in the sure and certain inheritance laid up for you in heaven; only, remember, you must do your own work thoroughly, without repining that you are not called to do the work of another. I do not deny that earthly fame is very pleasant, and that it is most natural to desire to win it. But surely, better still it is to know that your name is written in the Lamb's book of life. The world's prizes are but for very few: difficult to win, and often hard to wear. But even could you call them yours, and could the whole universe ring with your praises, how would the plaudits die away before the sound of those few words, 'Well done, thou good and faithful servant, enter thou into the joy of thy Lord!'

"We cannot all be George Stephensons, but we can all do what he did: work out our given task with untiring energy and zeal; only let us make sure that we do it unto the Lord, and then we need not fear that we shall ever come short of our reward."

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